APR 12 1924
Medical Lib.

Series 3, Vol 7, No. 4 APRIL, 1924

AMERICAN JOURNAL OF OPHTHALMOLOGY

Incorporating — Established by

THE AMERICAN JOURNAL OF OPHTHALMOLOGY.....Adolph Alt 1884
THE OPHTHALMIC RECORD .....Giles C. Savage 1891
ANNALS OF OPHTHALMOLOGY .....James Pleasant Parker 1892
ANALES DE OFTALMOLOGIA .....M. Uribe-Troncoso 1898
OPHTHALMOLOGY .....Harry Vanderbilt Würdemann 1904
OPHTHALMIC YEAR BOOK AND LITERATURE.....Edward Jackson 1904-11

EDITORIAL STAFF

EDWARD JACKSON, Editor
M. URIBE-TRONCOSO
MEYER WIENER
CLARENCE LOEB, Associate Editor
CASEY A. WOOD
HARRY V. WÜRDEMANN

COLLABORATORS

Frank Allport, *Chicago;* Hugo W. Aufmwasser, *Cincinnati;* Hans Barkan, *San Francisco;* Arthur J. Bedell, *Albany;* Edmond E. Blaauw, *Buffalo;* Melville Black, *Denver;* Frank E. Brawley, *Chicago;* Burton Chance, *Philadelphia;* William H. Crisp, *Denver;* Edward C. Ellett, *Memphis;* Marcus Feingold, *New Orleans;* William C. Finnoff, *Denver;* Walter S. Franklin, *San Francisco;* M. W. Fredrick, *San Francisco;* Harold Gifford, *Omaha;* Sanford R. Gifford, *Omaha;* Harry S. Gradle, *Chicago;* D. F. Harbridge, *Phoenix, Arizona;* William F. Hardy, *St. Louis;* Emory Hill, *Richmond, Va.;* Thomas B. Holloway, *Philadelphia;* John A. McCaw, *Denver;* Lloyd Mills, *Los Angeles.* William R. Murray, *Minneapolis;* Walter R. Parker, *Detroit;* Lawrence T. Post, *St Louis;* F. Mayo Schneideman, *Philadelphia;* Theodore B. Schneideman, *Philadelphia;* George E. de Schweinitz, *Philadelphia;* Thomas H. Shastid, *Superior, Wis.;* Charles P. Small, *Chicago;* D. L. Tilderquist, *Duluth;* Henry P. Wagener, *Rochester, Minn.;* William Zentmayer, *Philadelphia;* Charles Zimmermann, *Milwaukee. Foreign:* Raul Arganaraz, *Buenos Aires, Argentina;* Sir James W. Barrett, *Melbourne, Australia;* Marcel Danis, *Brussels, Belgium;* Robert Henry Elliot, *London, England;* Julius Fejér, *Budapest, Hungary;* F. M. Fernandez, *Havana, Cuba;* J. de J. Gonzalez, *Leon, Mexico;* Harvey J. Howard, *Peking, China;* M. Landolt, *Paris, France;* Arthur F. McCallan, *Cairo, Egypt;* Speciale Cirincione, *Rome, Italy;* Frederick C. Tooke, *Montreal, Canada;* Major R. E. Wright, *Madras, India.*

Single number, one dollar

Published Monthly by The Ophthalmic Publishing Company
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

Punktals are a Great Invention

BECAUSE many people need glasses for both near and far vision—bifocals were designed.

BECAUSE certain light rays trouble the eyes of many people—Crookes and other colored glasses were invented.

BECAUSE every wearer of glasses wants as wide a field of view as possible—**Punktals** were invited. **Punktals** have the widest use. They will benefit every person who wears glasses.

We carry comprehensive stocks of Bausch & Lomb Punktals, and can give your orders prompt attention.

Riggs Optical Company

DEPENDABLE* ℞ *SERVICE

OMAHA	MANKATO	GREEN BAY	COUNCIL BLUFFS
DENVER	HASTINGS	LOS ANGELES	BOISE
SEATTLE	IOWA CITY	OKLAHOMA CITY	BUTTE
MADISON	GREAT FALLS	FARGO	SPOKANE
SIOUX CITY	SALT LAKE CITY	TACOMA	WATERLOO
SIOUX FALLS	OGDEN	LINCOLN	FORT DODGE
SAN FRANCISCO	SALINA	PORTLAND	KANSAS CITY
QUINCY	WICHITA	POCATELLO	PITTSBURG, KAN.
PUEBLO	APPLETON	CEDAR RAPIDS	RENO, NEVADA

FIG. 1. APPEARANCE OF ORA SERRATA VISIBLE IN THE PUPIL IN CASE 1

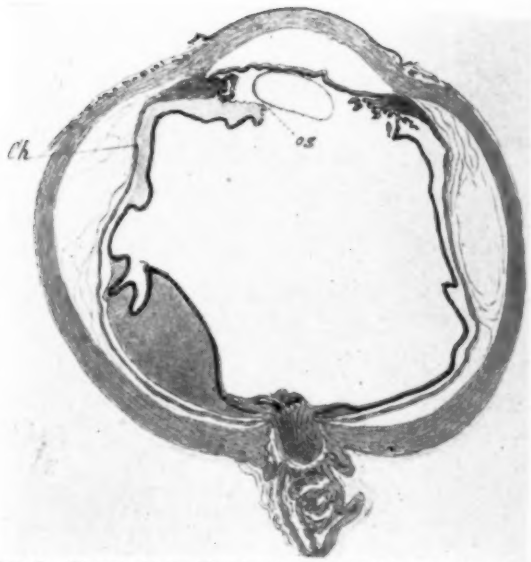


FIG. 2. SECTION OF EYEBALL IN CASE 2. CH. CHOROID O. S. ORA SERRATA

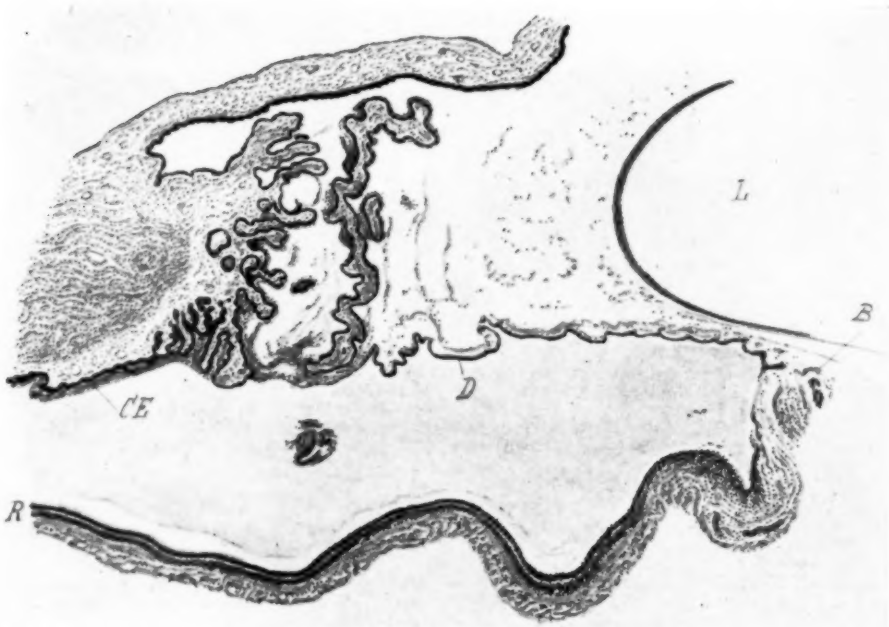


FIG. 3. PART OF FIG. 2 MORE MAGNIFIED. L. LENS. B. BLOOD. D. DETACHED PORTION OF UNPIGMENTED CILIARY EPITHELIUM C. E. CILIARY EPITHELIUM IN NORMAL POSITION. R. RETINA. A. FUCHS' PAPER ON VISIBILITY OF ORA SERRATA

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 7 APRIL, 1924 No. 4

VISIBILITY OF THE ORA SERRATA.

ADALBERT FUCHS, M.D.

VIENNA, AUSTRIA.

Two cases are here reported of traumatic detachment of the retina, in one of which the ora serrata was visible in the pupil by focal illumination. In the other case, examined histologically, there was similar displacement of the oral retina which could not be seen thru the contracted adherent pupil, and opaque lens. The relations of such a displacement and probable causes are discussed. This is a contribution from the Peking Union Medical College where Dr. Fuchs is the visiting Professor of Ophthalmology for the year 1923–24.

Trantas[1] showed (Arch. d'Opht. 1907, v. 27, p. 581) that if pressure is applied on the globe between the equator and the root of the iris, the ora serrata and the ciliary body as far as the ciliary processes can be seen with an ophthalmoscope. He employs the direct method of examination with a plus 4 or plus 8 diopter lens. The discomfort is said to be so slight when pressure on the sclera is made with the surface of the examiner's thumb nail, that cocain is unnecessary. To a trained examiner a mydriatric may be unnecessary.

Exceptionally the ora serrata may be visible without resorting to such a method of procedure. I wish therefore to report a case in which the ora serrata was visible by focal illumination. (Fig 1, Plate VI.)

CASE I. *History*: A soldier, 41 years of age, was temporarily buried in a trench on account of an explosion, about six years ago. When the debris was removed he immediately noticed that the vision of the left eye was totally gone.

Clinical examination: Left eye: externally normal. The pupils are equal in size. After dilatation of the pupil one sees with focal illumination, a somewhat wavy grayish vesicle, apparently lying on the posterior surface of the lens. It shows a slightly curved and tortuous yellowish-brown line running more or less parallel to the border of this vesicle.

Examination with the slit lamp: The vesicle is recognized as being formed by the detached retina. The retina and the yellowish-brown line are in close contact with the posterior surface of the lens. The areas immediately adjacent to the yellowish-brown jagged line, above and below, seem to have the same appearance and structure.

Ophthalmoscopic Examination: The retina is seen to be detached at the outer and lower side. Behind, it is thrown into numerous folds traversed by retinal vessels. Here, the detached retina is gray but in front it is pinkish and is avascular and translucent. Posteriorly the detachment is flat; but anteriorly, it is pushed inward in the form of a vesicle.

The lens is not subluxated. No fibers of a new formed membrane can be seen at the posterior surface of the lens. The vision is nil.

On account of the lack of blood vessels and the reddish color of the anterior portion of the detached retina, I thought at first that it was a cyst of the retina, or a splitting of the retina into two sheets. But that is not possible, for without doubt the brownish line crossing the pupil below is the ora serrata. This is proved by its position, the zigzag course, and the pigmentation of the line. Hence, the fact that the anterior portion of the detachment appears avascular and translucent is easily explained. This portion of the retina is near the ora serrata, where blood vessels are extremely minute and where the retina is so thin that it is more or less translucent. The

thinness of the retina is increased by the traction that causes the detachment and perhaps, also, by a cystoid degeneration of Ivanoff, which is common in the oral portion of the retina. All these factors may have caused the translucency of the anterior portion of the detached retina.

In anatomic sections we find the explanation of why we can see, in this case mentioned above, the ora serrata clinically behind the lens without a laceration of the retina. In these sections there is not only a detachment of the retina, but the continuation of the retina in front, that is, the unpigmented epithelium of the ciliary body, is also detached.

To make this point more easily understood, I wish to describe a case in more detail where I have found on the slide the ora serrata lying on the posterior lens surface.

Case II. *History*: A boy, 11 years old, injured his right eye four months ago with a small knife. After the injury he could see, but four weeks ago he became blind.

Physical Examination: Cornea is lustrous, transparent. A vascular scar runs from the center of the cornea downward and outward. The iris is adherent to this scar. The anterior chamber is shallow; in the region of the scar it is abolished. The pupil is visible as a small black point. Light perception at 3 meters. Projection poor. The eye was enucleated.

Histologic Examination: The knife perforated both the cornea and the iris and penetrated into the circumlental space without injuring the lens itself. The wound in the cornea is healed by a scar. Corresponding to the place of the injury a fine new formed membrane of connective tissue covers the ciliary process. From here the membrane runs to the equator of the lens and covers its posterior surface as a thin layer.

Both the retina and the unpigmented layer of the ciliary epithelium, the so-called pars ciliaris retinae, have been pulled off from the underlying tissues against the posterior lens surface by the shrinking of this membrane. However, neither the retina nor the delicate epithelial pellicle is anywhere torn.

Some islands of the unpigmented epithelium are left upon the surface of the ciliary body; these are, as often happens, proliferated in places and have produced new plates of unpigmented epithelium.

These plates are composed of several layers of unpigmented flat cells. The detached pellicle consists only of one row of cylindrical cells. Hence the ciliary body is covered in some places by only a naked layer of pigmented epithelial cells. In other places this pigmented epithelium is covered by several layers of unpigmented epithelial cells.

Plate VI., Figs. 2-3, show a section to one side of the region of injury and to one side of the membrane. The retina (Fig. 3, R) and the pars ciliaris retinae (Fig. 3, D) are here detached but the membrane running from the ciliary process to the lens in the area of the injury is not visible in this section.

The retina (Fig. 2) is more detached behind and lies there in folds. In front there exists only a flat detachment. The choroid (Ch) is separated from the sclera by an artificial space, due to the shrinkage of the specimen.

The ora serrata (O. S.) lies on the posterior surface of the lens and would have been visible by focal illumination if the pupil had been wide and the lens transparent. The unpigmented epithelium (Fig. 3, D. R) of the ciliary body runs from the ora serrata to the ciliary process as a fine wrinkled line; it consists of a single layer of cells. The inner surface of this layer of cells, which normally outlines the vitreous cavity, is turned in front toward the posterior chamber, and the outer surface (where the letter D is printed), normally lying upon the pigmented epithelium layer, now faces backward.

The flat part of the ciliary body is covered again in its anterior portion by a layer of unpigmented cells (CE). This layer is newly formed and is developed from the remaining islands of cells above described.

L is the lens, R the retina.

On the ora serrata no pigment remains attached. On the other hand there is some blood (B) found at different places in the angle formed previously by the retina and the pars ciliaris retinae.

In the present case the retina, as often happens, together with the pars ciliaris retinae, was drawn forward by a membrane. Apparently the connection of the cell layer of the pars ciliaris retinae with the retina is more intimate than with the subjacent layer. This is easily explained by the embryonic development. The retina and the pars ciliaris retinae belong together embryologically, both being parts of the interior sheet of the secondary optic vesicle. The pigmented epithelium of the ciliary body, on the other hand, belongs to the outer sheet of the secondary optic vesicle. Between the pigmented epithelium, which belongs to the outer sheet, and the nonpigmented epithelium or pars ciliaris retinae, which belongs to the inner layer, there exists in the early embryonic stages a capillary space.

Hence these two layers are only slightly connected with each other. Likewise the retina is only slightly adherent to the pigmented epithelium of the choroid.

The case mentioned above (Case I) which was observed only clinically, differs from the latter (Case II) by the fact that we could not find any trace of a perforating injury or of a membrane in the vitreous cavity. I believe that a hemophthalmos had occurred, due to the contusion. This is proved by the patient's statement that immediately after the injury the eye was blind. The blood in the eye was probably absorbed later on, but fine fibers of connective tissue were formed in places. By the shrinkage and contraction of these fibers the retina and the ora serrata were gradually drawn forward. This contratraction by shrinkage was perhaps the reason why the fibers were not visible on focal illumination or with the ophthalmoscope.

It may be possible that in Case I, an active pushing force was produced either by blood immediately after the contusion, or later by a serous fluid which separated the retina and the pars ciliaris retinae from their subjacent tissue. I do not believe this is probable, because the circumscribed form of the detachment can hardly be explained by this etiologic factor. A hemorrhagic detachment of the retina would be more marked in the posterior part of the eye and would not cause a special pushing forward of the ora serrata and the nonpigmented layer of the ciliary body.

The ora serrata appeared clinically as a brownish line. This color may be due to blood pigment. This suggestion is substantiated by the finding of blood at this particular place histologically in Case II (Fig. 3 at B). The brown color could also be caused by pigment from the pigmented epithelium, particles of which might have been torn away during the detachment of the ora serrata. This, I believe, is a more probable explanation, as in such slides of detachment of the ciliary epithelium I have frequently seen some pigment on the ora serrata. This pigment usually lies on the external surface of the retina; the ora serrata being very thin renders it visible clinically.

Apparently the pars ciliaris retinae is most often detached by a traction which acts slowly and from the posterior surface or pole of the lens. A traction from in front does not detach the pars ciliaris retinae but draws the retina over the cilary body. This is the socalled supertraction of the retina described by Leber.

If a force acts very suddenly the retina is very often torn away from the ora serrata. Such cases have been described by Velhagen, Nordenson and others, and lately by Bergmeister. If the acting force is very strong the retina may be torn away everywhere from the ora serrata. After the resorption of the hemorrhage the retina may be visible ophthalmoscopically, folded together and shrunken upon the papilla. Such a case was observed by Otto Barkan, in which the retina was totally torn away from the ora serrata during intrauterine life. The retina was folded together and appeared as a white tumor in the posterior part of the eye. The eye was enucleated on account of the possibility of it being a glioma. The anatomic examination showed small parts of the nonpigmented epithelium of the ciliary body (pars ciliaris retinæ) adhering to the retina.

In eyeballs entirely destroyed by very severe contusions, we find quite frequently a total tearing away of the retina from the ora serrata, and the re-

tina is embedded in the hemorrhage which fills the globe. More often after a severe contusion, the retina is only partially torn away from the ora serrata. Such a tear is seen sometimes as an artefact. (See plate XLI, Figure 4 of A. Fuchs, Atlas of Histopathology.) In this way a variety of interesting ophthalmoscopic pictures are produced.

I had the opportunity of examining the eye of a young locksmith in which the vision was destroyed some years ago following a blow of a fist.

The ophthalmoscopic examination showed that the retina was torn away from the ora serrata on the nasal side and was drawn to the temporal side by a shrinking membrane of connective tissue. The retina resembled a twisted cord extending from the papilla to the temporal side. On the nasal side the choroid was bare and no retinal vessels were present. All the retinal vessels were seen running definitely from the papilla, in the grayish opaque cord like folded retina, to the temporal side. The exposure of the choroid on the nasal side was due to the fact that the entire retina was here torn away and lay on the temporal side.

Because the different membranes of the eye are connected to one another in different degrees of intimacy, different clinical pictures are produced, according to the kind and the direction of the acting force. I wish only to add here that I have never seen the ora serrata in cases of detachment of the ciliary body and choroid which sometimes occurs after operation. It would be seen perhaps if a special examination were made for this detail.

LITERATURE.

1. Arch. d'Ophtalmologie, 1907.
2. Arch. für Ophthalmologie, vol. 71, p. 531.

ADENOCARCINOMA PROBABLY ARISING FROM LACRIMAL GLAND.

LEE MASTEN FRANCIS, M.D.

BUFFALO, N. Y.

After removal of the left eye in infancy, this patient sought restoration of the socket, so that she could wear a prothesis. Thickening of the temporal portion of the tarsal plate was removed, hoping to improve the cosmetic result. Section and examination of the tissue, showed the structure of adenocarcinoma. Read before the American Ophthalmological Society, June, 1923. (Published with illustrations of histology in its Transactions.)

At the last meeting of the American Academy of Ophthalmology and Oto-Laryngology, the reader reported a case of malignant lymphoma of the lacrimal gland, to which a complete bibliography was appended. In that paper, free reference was made to a contribution by Laura A. Lane, in Volume 5, No. 6 of the AMERICAN JOURNAL OF OPHTHALMOLOGY, in which the entire subject of lacrimal gland tumors was thoroly summarized and painstakingly reviewed. Dr. Lane pointed out that only 229 cases had been reported in 323 years. In her statistics, adenocarcinoma appears four times, while in the author's bibliography cases which might be classed as adenocarcinoma are found only eleven times. Adenocarcinoma apparently arising from an accessory lacrimal gland is very rarely encountered.

The case herein reported is unusual, not only because of its manifest rarity, but also because malignancy was not diagnosed, encountered almost by accident, and recognized only by the pathologist.

History: The patient, an unusually robust girl of 18, sought help in order that she might wear a prothesis. Her left eye was removed in infancy because of a "tumor." Further history or details were unobtainable. She wore an artificial eye until a year before being seen, at which time a mass appeared under the upper lid, near or at the outer canthus. She consulted a colleague who trimmed away the tumor. The specimen

was sent to the State Institute for the Study of Malignant Disease. The specimen showed no malignancy, but owing to the indefinite history, thoro radiation was given. Following radiation and surgical interference, the socket became so contracted that the wearing of a prothesis was impossible.

Examination: The left socket was contracted so that barely the nasal third remained. Both upper and lower lids were firmly adherent to the structures beneath, all forming what appeared to be a dense fibrous tissue mass. The nasal portion of the tarsal plate with its fornix appeared normal. Springing from what remained of the temporal portion of the contracted fornix, very near the external canthus, was a pedunculated nodule about the size of a split pea. The lacrimal, preauricular and sublingual glands were not palpable. This nodule was trimmed with scissors and sent for examination. It proved to be granulation tissue. The Wassermann was negative.

After conference with the pathologist and clinician at the State Institute, a plastic operation for the restoration of the socket was deemed safe. Consequently six months ago, the socket was enlarged by two thirds at the Buffalo General Hospital, by an epidermal graft on a mold of dental compound.

The temporal portion of the tarsal plate was exposed while fashioning the socket. While the nasal portion of the plate appeared normal, the temporal portion was firmly and evenly thickened, and while resembling cicatrical tissue, still was evidently not. Chiefly for the purpose of procuring a thinner and better appearing lid, and partly because the tissue did not appear normal, the thickened portion of the plate was cleanly excised and sent to the laboratory.

The mold was removed after seven days, the epidermal graft being a complete "take". After trimming away the excess epidermal graft and a few days cleansing, an artificial eye was fitted and the patient left the hospital. The prothesis has been worn with good cosmetic results, and repeated examinations have shown no evidence as yet of recurrence.

I am indebted to Dr. Roman, Pathologist of the Buffalo General Hospital, who has kindly supplied the description and discussion and microphotographs of the specimen.

LABORATORY REPORT.

Received for examination several small, flat pieces of tissue in 10% formalin solution.

In the routine frozen sections the tarsus and its glands could be recognized, and external to the tarsus there was an epithelial component, the greater part of which had fallen out, leaving holes in the section. For this reason the remaining tissue was hardened, imbedded in cellodin, and new sections prepared.

The latter apparently correspond to the more proximal parts of the excised tissue, as they do not show any of the structures of the distal parts of the lid. The sections consist chiefly of dense, poorly nucleated, fibrous tissue, adjoining which there is, in some places, a considerable amount of fat and areolar tissue, carrying blood vessels and nerves. In these latter parts are found imbedded several lobules of an acinous gland separated from each other by connective tissue septa, and coresponding in appearance to those of the lacrimal gland. In other places there is also present some hyalin connective tissue, arranged in bundles and appearing in cross or oblique sections; which, judging from the shape and position of the nuclei, might well represent the tendinous fibers of the levator palpebrae muscle.

In the neighborhood of the gland lobules, some normally appearing ducts are to be seen, with a double row of cylindrical epithelium. Distant from these, imbedded in the dense connective tissue, there are many more ducts, in a state of abnormal hyperplasia. They appear considerably dilated and are lined with several rows of epithelium; which is often reduplicated, giving a papillary appearance. The cells are cylindric or cuboidal depending upon their situation in the inner or outer layers, and show mostly deeply staining nuclei and clear cytoplasm. In the vicinity of such ducts numerous epithelial structures can be seen, apparently springing from the

ducts and composed of cuboidal or polyhedral cells, showing usually a faintly staining, structureless, round or oval nucleus, and a very clear hardly staining cytoplasm. These structures are of various shapes, occurring either in the form of acini with a small lumen, or in the form of solid plugs; and most of them usually show a very thin basement membrane. Immediately outside of the duct, they form a mantle surrounding it, and thoroly substituting its connective tissue backing; but they are more widely scattered, in regions farther away from the duct.

Besides those in relation to ducts, such epithelial formations, especially in the form of more solid plugs, are to be found invading the connective tissue diffusely in many places, and also in the tendinous fibers mentioned above.

Unfortunately the material was not kept, and the rather thick specimens stained with hematoxylin and eosin did not allow of any fine histologic studies. But there can be little question that the pictures seen represent an adenomatous hyperplasia, and in the heterotopic growth there is sufficient histologic evidence of malignancy of the nature of an adenocarcinoma, tho the growth be temporarily arrested, possibly from the effects of radiotherapy.

In view of the controversy regarding the nature of many of the tumors of the lacrimal gland (endo or epithelial), it is perhaps well to emphasize that, altho in some places the cells of the growth are quite changed in appearance, resembling superficially the socalled endothelial cells of mixed tumors of the parotid, a sufficient number of transitional pictures from the epithelial elements of the ducts have been seen to exclud any reasonable doubt as to their epithelial nature. Whether the tumor is a remnant of the old embryonal growth, for which the eye was enucleated in the early life of the patient, or a new growth of more recent date, originating as it appears from remnants of the lacrimal gland (duct), will hardly be determined upon the evidence at hand.

POSTOPERATIVE ADHESIONS OF THE VITREOUS TO THE CORNEA.

MAURICE H. COTTLE, M. D.

CHICAGO, ILLINOIS.

This paper reports four cases observed in the clinic of Professor Meller in the University of Vienna. The vitreous fibers attached to the cornea were observed with the slit lamp. It is concluded that they constitute a frequent complication after discission. The condition of the vitreous and the operative technic are probable causes. They may help to cause secondary glaucoma, late infection, or prolapse of the vitreous. Read before the Chicago Ophthalmological Society, Oct. 22, 1923. See page 227.

The attention of the writer was drawn to the importance of this subject by a patient who presented himself with a horizontal spindle shaped pupil following a discission operation for secondary cataract.

to the cornea was seen in consequence of a discission operation.

This condition has been known for many years. But especially thru the use of the slit lamp have exact observations and more frequent and sure recog-

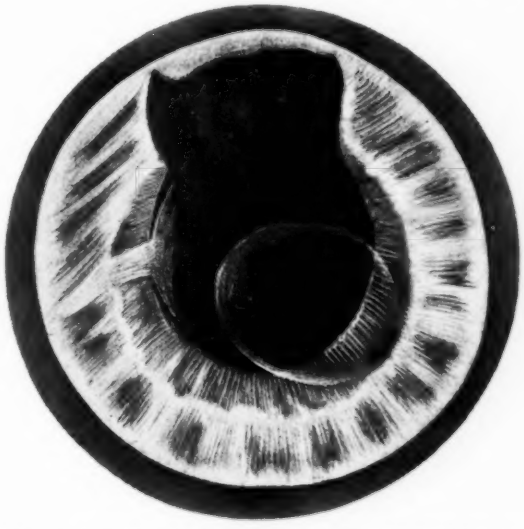


Fig. 1.—Case 2 showing hemorrhage in anterior chamber resting on prolapse of the vitreous. The cyst oval below.

Altho the clinical picture of strands of vitreous adherent to the cornea is doubtless known to many oculists, a search of the literature reveals but few references which have an exact bearing on the subject. The enormous amount of related literature which might contain some references, makes an exhaustive study practically impossible. In many of the latest works on operative complications and slit lamp studies, no references whatever were found. Elschnig[1] mentions that after discission of the capsule a vitreous thread may heal in the corneal wound. Parsons[2] states, only, that in a case of glaucoma a thread of vitreous adherent

nition become possible. The cases here presented were collected in a very short time and without any great difficulty, so the writer feels that this complication is a more frequent one than would at first be supposed.

Most of these cases of anterior synechiae of the vitreous followed the discission operation with knife needles for secondary cataract. The following are typical and quite representative.

CASE 1: (simplest form). M. A., female, age 43, both eyes normal, excepting for a nuclear cataract of the left eye. Slit lamp examination was negative. Cataract operation done, followed in two days by hemorrhage into the an-

terior chamber. The wound healed well, and the patient was discharged in two weeks with a delicate secondary cataract. Eight months later, a discission with two needles, both in the cornea, was performed. Next day, the hole in the secondary cataract was slit shaped, and from beneath the nasal region a very few, thin, colorless, delicate threads were seen going into the nasal corneal wound. These threads could be grasped with very fine forceps, and could be pulled out of the wound. With the slit lamp, by with the slit lamp. Cyclodialysis was performed with good results and tension remained low. Two months later, the patient felt some change in her eye, which subsequent examination showed to be due to a spontaneous hemorrhage into the anterior chamber. The blood was seen to rest in the superior portion of the anterior chamber, as if supported by some underlying tissue. Examination with the slit lamp revealed a prolapse of the vitreous with blood lying on the upper surface.

Fig. 2. Case 3. Lateral adhesions of vitreous to the cornea making pupil a horizontal oval after two-needle discission of cataract.

using various gradations of light, the threads were seen to be arranged in triangular form, with the base in the depth of the vitreous and the apex in the corneal wound. The secondary cataract was sharply defined and not connected with the threads. Four days after the discission, the corneal wound was treated with the electrocautery, following which the wound healed perfectly and the threads disappeared.

CASE 2: L. W., female, age 23. Cataract operation (linear extraction) performed in 1913. Iris prolapse occurred and was excised. A secondary cataract ensued and later was needled. In 1922, the patient presented herself with a typical picture of glaucoma, for which no cause could be found. Later a vitreous adhesion to the cornea was seen

CASE 3: (Probably the most marked form of synechia of the vitreous). A. P., male, age 37. At the age of ten (1896), patient was operated on for cataract of the left eye (linear extraction). In 1904, the right lens was removed and discission with two needles done on the left eye. 1923, patient came for a discission of the secondary cataract in the right eye.

Examination of the left eye showed the following: Eye quite pale; lower part of limbus has a thick postoperative scar; the cornea is smooth and lustrous. In the horizontal meridian, about 2 mm. from the limbus on both sides, is a small macula, (following discission), from the under surface of which strands of a transparent tissue pass into the depths of the vitreous, spreading out

fan like as they go. These strands run underneath the definitely limited, sharp outlines of the secondary cataract. The individual strands are much less delicate than those seen in cases one and two, and wherever in their course they touch each other, the iris, or the secondary cataract, an adhesion is found. They are yellow tinged and quite tough in character. Since they are attached to two opposite parts of the cornea, and are but slightly resilient, the pupil, when not dilated, has a horizontal spindle slightly temporalwards. Vitreous was seen in the wound.

April 20, 1923, pupil absolutely black; margin at site of operation pulled towards the limbus. With the slit lamp, this irregularity was seen to be due in part to vitreous fibers displacing the iris towards the corneal scar. Tension 30-35, Schiötz.

To sum up the outstanding characteristics of these vitreous adhesions to the cornea; one may say from a study of these cases, that: First they are

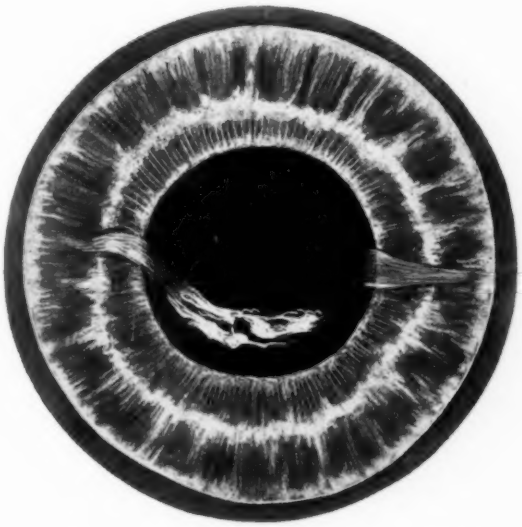


Fig. 3.—Case 3. Appearance after dilatation of the pupil which became circular.

shaped form. Vision: Fingers at 1.5 m.; with plus 11 sph., 6/60 and with plus 15 sph., J. 16. After discission of the right eye, threads of vitreous going to the corneal wounds were seen. They have persisted to date. Vision with plus 11 sph. 6/12, with plus 15 sph. J. 1.

Case 4: (Where no secondary cataract was in the operative field). A. B., age 13, female. Intumescent cataract removed Nov. 28, 1921. Healing normal; secondary cataract formation in upper limits of pupillary region and in the coloboma. April 1, 1923, vision was found reduced, some ciliary injection was present and the lower part of the iris was pulled upwards. Treatment, atropin and hot dressings. June 6, 1922, iridotomy was performed below and veritably synechiae originating in the vitreous itself and not in the secondary membrane. Their direction is from the vitreous; they turn beneath the remaining lens structure and go across the anterior chamber to the corneal wound, after leaving the pupillary space. Second, their structure is not uniform, but varies from delicate, almost invisible threads, to yellow-tinged, coarse, large fibers, which are tough and not elastic. Third, depending on the structure and the direction of the fibers, certain irregularities of the pupil occur; such as localized indentations or very marked distortions. Fourth. Synechiae do not tend to heal, or disappear spontaneously. On the contrary, they last indefinitely. One of our cases presented the condi-

tion after 19 years. Fifth. In most cases it is not possible to make direct observations without the use of the slit lamp. Especially is this true of the mildest forms; where the threads are so thin and delicate, that only by very close inspection and changes in the intensity of light can they be made out.

One may surmise that the occurrence of this complication depends upon the composition of the vitreous, or upon the technic used during the operation, or both. The composition and structure of the vitreous, as is well known, may vary a good deal. It may be compact or fluid, or every gradation between the two. Where there is a fluid vitreous, adhesions such as we are now considering are of course quite impossible. Escape of fluid vitreous in a cataract operation never results in an adhesion between the vitreous and the corneal scar, which can be clinically observed. Slit lamp studies often show changes in the nature of the vitreous in old people, and in those whose eyes present other demonstrable pathology. Many authors in the past have considered some changes of the vitreous to be due to a primary endogenous infection of the vitreous, or of its limiting membrane. Of recent years, this condition has been shown as never occurring. It is fair to presume that general constitutional diseases, such as lues, may have some influence on the nature of the vitreous, and many authors are now of the opinion that changes of a chemical nature change the composition of the vitreous. In this connection Ziegler[3] writes that after discission for secondary cataract, a thin membrane over the vitreous in the pupillary margin may occur as a result purely of chemical changes.

Perhaps, therefore, the structure of the vitreous as given by Salzmann[5], espe-

Fig. 4.—Case 4. Adhesion of vitreous downward following iridotomy. Done after removal of cataract.

cially of the anterior region, might explain the formation, the appearance and the resistance of such anterior synechiae. Frequently, at the time of operation, the vitreous is pulled into the corneal wound, by the knife, but if it is fluid or presumably normal, it retracts again and no further changes take place. If on the other hand a permanent adhesion, strong enough to be able to cause a distraction of the pupil ensues, one is led to the thought that this accident is to be expected, especially when some fibers of the anterior portion of the peripheral layer of the vitreous or the socalled ligamentum hyaloideo-capsulare (Salzmann) are pulled into the wound.

In addition, very likely there is some special development or a change in these fibers, microscopically at least. These

possibilities would also fit in with the slit lamp pictures which showed definite fiber like structures not connected at all with capsule remains. On the other hand, perhaps, after the formation of these fibers, which may be at first quite delicate as in case 1, a low grade inflammatory reaction may be called forth. This may cause quite a change in the fibers, especially in their size and consistency, and may lead eventually to the formation of the very coarse translucent fibers seen in case 3.

The technic of the operation must also be considered. Thus, the site of the incision could play quite a role, as only in cases where the cornea was pierced an appreciable distance centrally from the limbus, was the development of vitreous synechiae seen. We have, therefore, one more reason for making subconjunctival incisions; operations with one knife, or a knife needle, should surely be performed in this way. It is also a well known fact that the danger of infection is much less after such an incision. When one does a discission with two needles, according to Bowman, it is of course not possible to avoid one needle being in the cornea. But with regard to the possibility of synechia, we believe that this stab wound should be localized as peripherally as possible. The shape of the knife may have some influence on the condition. Elschnig mentions that a sickle shaped knife may pull threads of vitreous into the cornea. It is selfevident that a sharp knife would be less apt to pull on the vitreous. The depth of the vitreous to which the knife is plunged and the method of withdrawal of the knife may also contribute to the formation of synechia. The knife should be returned to its original horizontal position after cutting thru the secondary cataract, and then very quickly and directly withdrawn.

The dangers of this complication are quite obvious. By the inclusion of the vitreous in the corneal wound, delayed healing of the latter is present, with the possibility of late infection. Also the reestablishment of the anterior chamber may be delayed, and thus afford an opportunity for the development of peripheral anterior synechia of the iris, and thence a secondary glaucoma as first described by Meller. The vitreous synechia may by itself, also, predispose to or even cause secondary glaucoma, and in addition may predispose to prolapse of the vitreous, as was probably the case in patient number two.

CONCLUSIONS.

1. Anterior synechiae of the vitreous constitute frequent complications after discission.
2. The probable causes are (a) the condition of the vitreous and (b) the operative technic.
3. Early and surer recognition is possible by the use of the slit lamp.
4. The synechiae may cause complications such as secondary glaucoma, late infection, and prolapse of the vitreous.

BIBLIOGRAPHY.

1. Elschnig. Operationslehre für Augenheilkunde.
2. Parsons. Pathology of the eye.
3. Ziegler, S. L. Am. Journal Ophthal. v. 3, p. 280, 1920.
4. Meller. Wiener med. Wochenschrift, 1921.
5. Salzmann. Anatomy and Histology of the Human Eyeball. Trans. by E. V. L. Brown, p. 148.

REFRACTION OF THE APHAKIC EYE AND THE PRESCRIBING OF SPECTACLES.

BURTON CHANCE, M.D.

PHILADELPHIA.

The refraction of aphakia depends largely on the refraction before removal of the lens; and also on the changes of shape of the cornea after operation. The refraction and vision in the other eye influence what it is practical to do with correcting lenses. Prismatic effects may be very troublesome, if the lenses have not been rightly centered. Read before the Section on Ophthalmology, College of Physicians of Philadelphia, Nov. 15, 1923. (See p. 309.)

When the invitation to participate in this symposium was received, I was in the act of prescribing spectacles for one who recently had been operated on for cataract. Despite the smoothness of the cicatrix in this case, the astigmatism was marked and difficult of correction. It occurred to me that I had heard in these halls but little concering aphakia and the prescribing of glasses after the extraction of cataract. Thus it is that I have chosen this subject, and I trust that what is said may be welcome to at least the younger members, who sometimes meet with perplexing problems in their efforts to prescribe spectacles after cataract extraction.

The refraction of the aphakic eye is governed by the kind and character of the ametropia which was present before the removal of the lens. An emmetropic eye becomes strongly hyperopic, a hyperopic eye still more so; whereas, a myopic eye will become hyperopic, or, if the degree of myopia was very great, it may even become emmetropic.

In the case of low degrees of hyperopia the removal of the lens will increase the hyperopia to from 10 to 12 D; in addition there is usually astigmatism against the rule. This astigmatism may be at first very high, but ultimately it diminishes to less than 3. D. Changes in the refraction may be marked for some time, and, until the measures are stationary permanent glasses cannot be fitted.

After the removal of the crystalline lens the power of accommodation is completely absent; it is therefore necessary to add to the glass a convex lens for near vision. A kind of accommodation can be exercised for distant and for near objects with a single pair of glasses, by changing the distances at which the glasses are held before the eye. And, by looking obliquely thru a strong convex glass, its effect will be greatly increased in all meridians but especially in the meridian of the obliquity. A few cases of socalled accommodation in aphakia have occurred when high plus corrections have been worn, but many more have been found in the cases of myopia which have been neutralized by the removal of the lens.

In successful cases, it many times has been found that the aphakic eye has become endowed with greater visual power than it had previous to the formation of the cataract, in so far as the optical system divested of its lens with the aid of spectacles produces larger retinal images than is possible in the normal eye. Nevertheless, the acuteness of vision after the most successful operation for cataract, even with the aid of suitable glasses, usually does not reach the normal standard, and one should not feel discouraged at the result. In old persons the reduction is frequently due to the changes which take place in all senile eyes, which so often considerably deteriorate the sight. Another, and not infrequent cause is to be found in the thickening of the inner surface of the capsular membrane, or it might be the wrinkling of the transparent capsule, which produces distortion and confusion of the retinal images.

All sorts of aberrations are likely to occur. I have found fewer annoyances, however, thru a clear round pupil after "simple extraction" than have arisen in the case of the coloboma after "combined extraction"; doubtless because of the differences in the refraction of different areas of the cornea in relation to the pupil. Also, the irregular astigmatism produced by the cicatrization of the corneal wound may never be amenable to correction.

At the first test strong convex sphericals should be employed; and in beginning the test it might be well to adopt a short range, which can be extended as

the tests proceed, and the strength of the spheres may be increased as the vision returns. When the greatest acuteness has been attained with the sphericals, cylinders are to be added of varying strengths, until the sharpest sight possible has been attained. Aphakics recognize variations of axes slowly and with difficulty. I have favored the ease of recognition by inserting the cylinder in the inner slot of the trial frame, with the curved surface near the eye.

The test for reading requires the addition of a spherical, commonly a plus 4, yet it might be less and sometimes it is much greater. Messrs. Wall and Ochs have made, for use in the trial frame, a set of spherocylindrical lenses, of appropriate strengths in various combinations, which are immensely useful in the refractions of aphakics. This set is lent to anyone of us who desires to use it. I cannot speak too highly of the utility of these trial lenses; nor adequately express my thanks for the kindness this well known firm has so constantly shown the profession in this city, in helping us meet the problems of our daily work.

In young aphakics it may be difficult to make the two eyes work together, so that it may be necessary to order the distance correction for one eye and the reading correction for the other. An inequality of the extraocular muscles may produce a true heterophoria, which, in certain cases, might be difficult to relieve either by prisms or by a partial tenotomy.

In cases of monocular aphakia where the vision of the other eye is very defective, reversible frames containing a lens for distance use and a lens for near, might be worn to obviate the necessity for two pairs, or to avoid the effects of bifocals. The frames have loose, free joints, by means of which the temple pieces can be turned from one side to the other.

When only one eye is aphakic, and the sight of the other is useful, the anisometropia may be relieved by the use of one half the spherical strength for distance for the aphakic eye, and the exact correction for the other. If bifocals are required the normal additions for the two conditions should be ordered.

As has been mentioned, the visual power of the glass can be varied by sliding the spectacles down from the eye, and by holding the reading matter at the conjugate focus, so that if the patient has a long nose, it sometimes may be possible to dispense with a bifocal segment. In cases of myopic aphakia, or where the hyperopia gradually changes into myopia, the necessity of wearing a correcting lens may be avoided.

The ordinary cataract glass possesses the great disadvantage of a limited range in the angle of vision, and with it, while the wearer might see brilliantly thru the center of the glass, the distortion of images as the angle approaches the edge of the glass may be so great as to prevent all peripheral vision. In addition, straight boundaries become curved, so that doorways are perplexing and walking up and down stairs all but an impossibility. And, the annoyance is augmented by the necessity to turn the head toward the objects, rather than by the rotation of the globe.

Instead of two pairs, solid or ground bifocals made in one piece may be worn, yet these are often uncomfortable because of a positive increase in prismatic effects. The segment is really a strong prism, with the base upwards, therefore, it might be necessary to order the centers of the segments displaced downward two or three degrees. In some cases the placing of the segments on the inner surface might lessen these effects.

Aphakics often complain of colored vision, a dazzling red or blue or yellow. These annoyances might be overcome by having the lenses made of Crookes' "A" or one of the various forms of tinted glasses.

Opticians have striven to devise glasses which shall not possess these defects. The thick, old fashioned, biconvex spherocylinder has been replaced by the toric lens which is thin and therefore light in weight, and with it the field of vision is enlarged. It combines in one surface the optical effects of a spherocylinder, or, of two cylinders of different strengths, at right angles to each other, like a section of an automobile tire; while a biconvex toric will afford better vision than can be obtained by any other type at present available in this country.

The adjustment of glasses after extraction, especially when both eyes have been operated on, is of the greatest importance, because the tilting of the glasses for distant use is quite different from that angle which should be adopted for near. While the distance glasses should rest almost in the vertical plane, being slightly titled at the top to overcome spherical aberration, they should be centered with the pupils. The glasses for reading should be centered towards the nose and at a lower plane than those for distance, in order to allow the patients to look thru the center of them. If such adjustments are not made the glasses act as prisms, either as bases out, or bases up, and thus cause diplopia.

Patients often complain of the distortions produced by the strong glasses which they must wear, to which, on account of their age they seldom, and then only after many months of perseverance, become completely accustomed.

Oculists of fifty years ago, noting the distortions produced by diffractions and diffusions thru the outer edges of strong lenses, sometimes prescribed wide horn rims which shut out the disturbing rays and compelled the wearer to concentrate upon the axis of the glass.

In contrast to these crude spectacles there is offered the elegant and ideal "Katral glasses" now made by Zeiss of Jena, which, so far, have not been imitated by American optical workers; they, therefore, must be obtained from Germany at great expense of time and money. These lenses have one surface aspheric, that is a surface which gradually flattens out. The images thru the periphery of the lens are seen as clearly as at the center.

SOME EXTRANEOUS FACTORS BEARING UPON REFRACTION.

WM. CAMPBELL POSEY, M.D.

PHILADELPHIA.

By pressure on the eyeball, its shape may be changed by pterygium, chalazion or other growths. Tumors of the orbit or other swellings may cause hyperopia or myopia. Reflex disturbances, focal infections and toxemia may impair the working of the ciliary muscle, and must be considered in this relation. Read before the Section on Ophthalmology, College of Physicians, of Philadelphia, November 15, 1923. (See p. 305.)

My theme is to speak briefly of some extraneous factors which may enter very largely into the refraction problem, and, sometimes overlooked, may interfere with the precision of one's results in the choice of lenses. I would refer to certain conditions which, by exciting pressure upon the eyeball, may modify the refraction by changing the shape of that organ; and also to the influence of various factors which, arising outside the eye, exert a marked influence upon it by their action upon the ciliary muscle. No mention will be made of the multitudinous conditions which may arise within the eyeball itself, and may modify refraction by interfering with the passage of the light rays.

In the former class may be ranged inflammatory swellings in the lids and in the conjunctiva, also certain abnormal orbital conditions which may exert extraocular pressure. Text-books make but little of these conditions, tho all trained ophthalmologists are cognizant of them, and remove them in so far as they may be able, before prescribing correcting lenses. A thickening of the retrotarsal fold in chronic conjunctivitis, the enlarged follicles in follicular conjunctivitis, in vernal conjunctivitis and in trachoma, deposits of lime salts in the conjunctiva, may make considerable change in the refraction and demand medicinal or surgical treatment before the proper glass is ordered. A pterygium, by the distortion of the cornea which it occasions, modifies refraction very greatly. In eyes otherwise ametropic, a + cylinder of 3. D. or even higher, at an axis vertical or thereabouts, will often be required to bring vision to normal. Growths within the lids may induce even greater changes, the most common and chief offenders being chalazia of various sizes. When growing from the medial aspect of the tarsus, they may be readily overlooked, even when comparatively large, and give rise to quite high degrees of astigmatism.

A demonstrative case is the following: J. E. G., a middle-aged man, always myopic and has worn glasses for years. Recent asthenopic symptoms when he reported for examination in June of this year, seemed to demand their change. Examination showed:

L. —S. 1.25⊖—C. 0.25 ax. 160°=5/5
R. —S. 1.87⊖—C. 0.25 ax. 180°=5/5

These glasses were prescribed and comfort was obtained for several months, when he returned complaining of poor vision in the left eye. A reexamination showed no change in the right eye, but in the left eye full vision was now secured by a —C. 0.25 ax. 160°, more than a diopter of myopia in that eye having disappeared. Further examination showed this was doubtless due to pressure exerted upon the eyeball by a rather large, hard chalazion growing from the upper border of the tarsus of the upper lid; and this conjecture proved to be correct, for one month after the removal of the growth full vision was obtained in the affected eye with —S. 1.⊖—C. 0.62 ax. 155°.

Altho the mobility of the eye in the orbit protects it in a measure from a change in shape from external pressure, it does yield to forces of considerable size. In my experience, such pressure has been excited most commonly by the encroaching wall of one of the adjacent sinuses, distended by the lymph of a mucocele. Increasing hyperopia has been noted in the early stages of some tumors of the optic nerve. All tumors and cysts, however, growing within the orbit may modify the refraction by pressure upon the globe. More or less displacement of the eyeball usually goes hand in hand with the refractive changes, which varies in position and degree according to the location and extent of the intraorbital encroachment, pressure exerted from behind making the eye more hyperopic, lateral pressure more myopic.

Of greater import because of their subtlety, their difficulty in detection and correction, are certain conditions of the ciliary muscle. These range from transient weaknesses to complete palsy, each modifying refraction according to the degree in which the amplitude of accommodation is affected. Tho we are already cognizant of a considerable number of causes which may operate to disturb the equilibrium of this muscle so peculiarly susceptible to toxic and other influences, it is not unlikely that still more will unfold themselves as our knowledge of biochemistry increases. Certain it is in my experience, that forces ordinarily insufficient to affect the mechanism of accommodation, may under less favorable conditions exert a decided deleterious action upon it. I have already hinted before this Society of the toxic action which nicotin appears to have upon the ciliary muscle, when the vitality of heavy smokers is impaired by gastric disturbances or impaired function of the excretory organs. Chronically inflamed nasal sinuses can generate toxins which markedly diminish the range of accommodation, this being especially the case if there is some associated disorder of the general system. Nasal obstruction alone, operating reflexly, can seriously affect accommodation, and we are just beginning to appreciate how frequently irregular action of the ciliary muscle is due to dental and tonsillar causes.

The bizarre effect of sugar upon accommodation has long been recognized; less well understood as yet is that caused by disorders of the internal secretions and intestinal toxemias.

Vascular hypertension is noted by Fuchs as a cause of ciliary weakness, and de Schweinitz adds early arteriosclerosis as a common cause. It may be of significance to note in this connection the change in accommodation appearing in the prodromal stage of glaucoma.

Syphilis has a strong predilection to affect the intraocular muscles, and in addition to the frank palsies of iris and ciliary muscle which may attend this infection, there are at times less pronounced weaknesses of accommodation, which may, however, be sufficient to point the way to the detection of serious involvement of the central nervous system.

To insist, before such an audience, upon the careful determination of the range of accommodation in all refraction cases would be of course superfluous; the statement is made for academic completeness, in concluding the phase of the subject alloted to me.

RETINITIS AND RENAL FUNCTION IN CARDIOVASCULAR RENAL DISEASE.

HENRY P. WAGENER, M.D.

ROCHESTER, MINN.

This paper is based on eighty cases, studied in the Section on Ophthalmology, Mayo Clinic, Rochester, Minn. These seem to show that retinal edema, exudates and hemorrhages, with hypertension, do not always mean nephritis. The type of nephritis cannot be decided by the type of retinitis. Retinitis of a nephritic type means progressive renal insufficiency, or functional conditions with malignant hypertension. Read before the Minnesota Academy of Ophthalmology and Oto-Laryngology, Nov. 16, 1923.

In the interpretation of findings in the ocular fundus in cardiovascular-renal disease, questions arise which are of interest to oculists and internists. Three of these stand out prominently: (1) Does the occurrence in the retina of edema, exudates and hemorrhages in a case of hypertension invariably mean nephritis? (2) If we assume retinitis to indicate nephritis, can the type of nephritis be diagnosed from the type of the retinitis? And (3) is the presence of retinitis invariably dependent on the retention of nitrogenous waste products in the blood? The present study is particularly concerned with the third question.

It seems to be the consensus of opinion that the first question can be answered definitely in the negative. Certain authorities even assert that the retinal changes are never directly due to nephritis. Volhard, for instance, regards hypertension alone as the cause of the retinitis, thru changes in the vessel walls and thru the production by arterial spasm of areas of ischemia and exudation. It seems, however, that certain types of retinitis are either renal in origin, or at least go hand in hand with renal insufficiency, and must be due to a circulating toxin. How far they can be interpreted to mean nephritis in the absence of other clinical and laboratory signs of nephritis, remains to be shown. Of a series of fifty cases of hypertension studied during life and at necropsy by Shaw, twenty revealed varying types of retinal changes. In all of the twenty cases there were pathologic changes in the kidneys at necropsy, but the changes varied from very slight to extreme, and in many instances, Shaw did not consider that the lesion warranted the diagnosis of nephritis. He says: "There is thus considerable excuse for the belief that albuminuric retinitis or albuminuric neuroretinitis is but another expression of a toxic process of prerenal origin, other expressions of which may be (not necessarily are) changes in the arteries and capillaries and kidneys and constant or occasional albuminuria. Changes in the retina should merely be accepted as indication of a grave toxemia, not necessarily of grave renal disease." This, I believe, is essentially the opinion today, provided the retinal changes are properly classified. There are certain changes that do not necessarily imply toxemia other than that involved in the production of arteriosclerosis, if it is assumed that arteriosclerosis is toxic in origin.

The second question can also be answered in the negative, perhaps with certain reservations. In a fair percentage of cases, I believe that it is possible to determine, from the retinal picture, whether the hypertensive disease is the primary factor, or whether there was at the onset an acute nephritis. The differentiation is complicated by the fact that, in certain cases of malignant hypertension in which nephritis can not be demonstrated by clinical or laboratory examinations, a neuroretinitis occurs, which I have not as yet been able to distinguish ophthalmoscopically from the classical albuminuric retinitis of chronic nephritis. Knowing that this condition occurs makes me more hesitant than formerly in making the diagnosis of "nephritic retinitis," and I am inclined to agree with Shaw "that albuminuric neuroretinitis is not a certain indication, even when combined with other symptoms, all pointing to kidney disease, that such kidney disease will take the form of 'granular kidney,'" and "that even albuminuric neuroretinitis is also a sign

of a toxemia resident in the blood," and that the qualification, 'albuminuric' neuroretinitis, is clearly shown to be misleading if it is considered to denote granular kidney, or any other form of grave kidney disease."

The answer to the third question is not yet clear. Assuming that there are certain types of retinitis definitely nephritic in origin, is renal insufficiency to an extent demonstrable by laboratory methods, necessary for their production? The importance of this question, aside from its purely academic interest, would seem to lie in the possibility of considering such retinitis, in the presence of good renal function, as indicative of a past attack of renal insufficiency, and hence the liability to future similar occurrences. Certain data seem to point to such a possibility in the case of one variety of retinitis.

If all the possible retinal findings, exclusive of vascular changes, are considered together, in cases of hypertension and nephritis, it is manifestly impossible to collect data on the condition of the kidneys, which will aid in the solution of any of the foregoing questions. It would seem more rational to divide the retinal lesions into small groups and to study these individually. On the basis of descriptions established as tentative entities by several authors, the retinal changes found in cardiovascular-renal diseases, in association with retinal arteriosclerosis of different types, may be classified into four main groups, (1) retinal hemorrhages without actual retinitis, (2) arteriosclerotic retinitis, (3) retinitis of hypertension plus nephritis, and (4) the retinitis of nephritis. It may be well to define these types briefly.

In a certain number of cases of hypertension, there occur, in association with retinal arteriosclerosis, a few scattered retinal hemorrhages without retinal edema and without exudates. These do not constitute a definite retinitis, could readily be produced by hypertension with local vessel wall changes, and do not necessarily need an added toxemia as a factor in their causation.

With more advanced local vessel wall changes, there may occur, besides hemorrhages, small areas of exudation, or degeneration which appear, ophthalmoscopically, as small bright white spots usually grouped around terminal arterioles, especially in the macular region. In places where the lumen of an artery has been completely or practically obliterated in a portion of its course, proliferation of new vessels also takes place. Thus a picture is produced which is designated as arteriosclerotic retinitis, and which is probably the result of severe endarteritis, and by no means typical of, or necessarily associated with nephritis.

In another group of cases, in a retina which often shows only a mild or moderate degree of arteriosclerosis, there appears slight edema of the optic disc, scattered hemorrhages of flame shaped, or round deep type, and a few white patches of soft-edged exudate with slight surrounding edema, so-called cotton-wool exudates. For the production of these acute changes, a toxic factor, other than that concerned in the slow production of arteriosclerosis, would seem to be necessary. The kidney has long been considered the source of this toxemia, and hence this type of lesion has been designated the retinitis of hypertension plus nephritis.

Finally, there are seen fundi in which the outstanding feature is hemorrhage and marked edema of the retina, the latter resulting in measurable swelling of the discs, "snow-bank" exudate in the retina around the disc with perhaps localized patches of increased density, "cotton-wool" exudates, and often a star figure in the macular region. These changes constitute the classical "albuminuric retinitis." They may occur without previous arteriosclerosis in the retinal vessels, and are hence designated the retinitis of nephritis.

In the present study, eighty cases of retinitis were grouped according to the foregoing classification. Of these, twenty-eight showed hemorrhages only. One proved to be a chronic glomerular nephritis, with blood urea of 272 mg. for each 100 c.c. and no return of phenolsulphonephthalein in two hours and fifteen minutes. Estimation of the blood urea was made in eighteen of the remaining cases and it was found normal in all. Phenolsulphonephthalein excretion was determined in twenty-three cases, and was

below 50 per cent in eight (35 per cent), below 35 per cent in three (13 per cent), and below 25 per cent in none. The systolic blood pressure was above 200 mm. of mercury in fifteen (53 per cent). The average age of the patients was fifty-seven years.

Twelve cases were diagnosed as arteriosclerotic retinitis. Blood urea was more than 45 mg. for each 100 c.c. in only one of the nine cases in which it was estimated. Phenolsulphonephthalein excretion was determined in ten cases, and was found to be below 50 per cent in nine (90 per cent), below 35 per cent in eight (80 per cent), and below 25 per cent in two (20 per cent). The systolic blood pressure was above 200 mm. of mercury in all. The average age of the patients was sixty years.

The diagnosis of retinitis of hypertension plus nephritis was made in twenty-three cases. One of these proved to be chronic glomerular nephritis. The remaining twenty-two belonged to the hypertension arteriosclerosis group, and a clinical diagnosis of secondary nephritis was made in seven. Estimations of the blood urea were recorded in eighteen cases, and were above normal in three (17 per cent). Phenolsulphonephthalein excretion was determined in twenty-two cases, and was below 50 per cent in twelve (55 per cent), below 35 per cent in six (27 per cent), and below 25 per cent in four (18 per cent). The systolic blood pressure was above 200 mm. of mercury in twenty cases (87 per cent). The average age of the patients was fifty-five years.

It is evident from the findings in this group of cases that we cannot consider this type of retinitis to be always indicative of lowered renal function. Certain facts seem to suggest, however, that the presence of cotton-wool exudates and hemorrhages, in a retina with arteriosclerosis of the hypertension type, means that the patient has a short time previously suffered from a transient renal insufficiency, as during the course of an acute infection, such as a head cold or tonsillitis. This variety of retinitis may, therefore, indicate a susceptibility on the part of the kidneys to the lowering of their functional capacity by such light infections.

The diagnosis of retinitis of nephritis was made in seventeen cases. Blood urea was over 45 mg. for each 100 c.c. in twelve (70 per cent). Phenolsulphonephthalein excretion was determined in fifteen cases, and was below 50 per cent in all, below 35 per cent in fourteen (93 per cent), and below 25 per cent in eight (53 per cent). The systolic blood pressure was above 200 mm. of mercury in ten (58 per cent). A clinical diagnosis of chronic glomerular nephritis was made in ten cases, of hypertension arteriosclerosis with secondary nephritis in four, and of hypertension arteriosclerosis in seven. The average age of the patients was thirty-eight years.

It is rather interesting to contrast the findings in the cases of chronic glomerular nephritis with those in the group of hyperpiesias and malignant hypertensions. Of the eighty patients studied, the final diagnosis of chronic

TABLE 1

	Retinal hemorrhages	Arteriosclerotic retinitis	Hypertension plus nephritis	Retinitis of nephritis
Cases	28	12	23	17
Average age, years	57	60	55	38
Average systolic blood pressure	187	218	206	196
Average diastolic blood pressure	109	123	125	126
Blood urea over 45 mg.	1 (5%)	1 (11%)	3 (17%)	12 (70%)
Phenolsulphonephthalein, under 50%	9 (37%)	9 (90%)	12 (55%)	15 (100%)
Phenolsulphonephthalein, 35% or below	4 (16%)	8 (80%)	6 (27%)	14 (93%)
Phenolsulphonephthalein, 25% or below	1 (4%)	2 (20%)	4 (18%)	8 (53%)
Diagnosed hypertension	27	12	22	7
Diagnosed chronic glomerular nephritis	1	0	1	10
Blood urea estimations	19	9	18	17
Phenolsulphonephthalein determinations	24	10	22	15

diffuse glomerular nephritis was made in twelve. In all of these, the blood urea was above normal, and the phenolsulphonephthalein excretion was below 35 per cent. Ten were diagnosed as retinitis of nephritis, one as retinitis of hypertension plus nephritis, and one as retinal arteriosclerosis with hemorrhages. The average age of the patients was thirty-six years. The average systolic blood pressure was 180 mm.; the average diastolic, 118. For the remaining sixty-eight patients, the principal diagnosis was that of hypertension and arteriosclerosis. Of these only five showed elevation of the blood urea, and ten, a phenolsulphonephthalein excretion below 35 per cent. Ophthalmoscopic diagnosis of the retinitis of nephritis was made in seven cases, of retinitis of hypertension plus nephritis in twenty-two, of retinal arteriosclerosis with hemorrhages in twenty-seven, and of arteriosclerotic retinitis in twelve. The average age of the patients was fifty-five years. The average systolic blood pressure was 203; the average diastolic, 120.

I have not had the opportunity of comparing carefully the difference in prognosis of the retinitis of chronic glomerular nephritis and that of malignant hypertension. In the present group, however, in practically all of the cases of chronic diffuse glomerular nephritis with retinitis, the renal insufficiency was progressive, and seven of the twelve patients are known to have died within sixteen months after observation. Of the other sixty-eight patients, only seven are known to have died in the same period; however, all have not been traced.

CONCLUSIONS.

1. Cases of hypertension with retinitis may be divided, ophthalmoscopically, into groups which show considerable differences in renal functional findings.

2. Arteriosclerosis of the hypertension type with hemorrhages, arteriosclerotic retinitis, retinitis of hypertension plus nephritis, and retinitis of nephritis, are readily distinguished. It is possible that the retinitis of malignant hypertension may be considered as a subdivision of the last group.

3. In cases of arteriosclerosis with a few hemorrhages in the retina, lowered renal function is only exceptionally associated.

4. Arteriosclerotic retinitis is seldom attended with retention of nitrogenous waste products in the blood, but the capacity of the kidneys to excrete phenolsulphonephthalein is usually reduced, possibly as a result of arteriosclerotic changes in the kidneys.

5. The retinitis of hypertension plus nephritis is not often associated with permanent reduction of renal function, altho it may indicate temporary renal insufficiency with a capacity for rapid return to normal.

6. Retinitis of the nephritic type invariably means progressive renal insufficiency in cases of chronic glomerular nephritis, but is found with functionally normal kidneys in patients with malignant hypertension.

TABLE 2

	Hypertensions	Chronic glomerular nephritis
Cases	68	12
Average age, years	55	36
Average systolic blood pressure	203	180
Average diastolic blood pressure	120	118
Blood urea over 45 mg.	5 (10%)	12 (100%)
Phenolsulphonephthalein under 35%	10 (16%)	10 (100%)
Phenolsulphonephthalein under 25%	5 (8%)	8 (80%)
Retinal hemorrhages	27 (39%)	1 (8%)
Hypertension plus nephritis	22 (32%)	1 (8%)
Arteriosclerotic retinitis	12 (17%)	0
Retinitis of nephritis	7 (10%)	10 (83%)
Blood urea estimations	51	12
Phenolsulphonephthalein determinations	61	10

BIBLIOGRAPHY.

1. Benedict, W. L. Retinitis of hypertension plus nephritis. Tr. Sect. Ophthal., Am. Med. Assn., 1922, 33-43.
2. Moore, R. F. The retinitis of arteriosclerosis and its relation to renal retinitis and to cerebral vascular disease. Quart. Jour. Med., 1916-1917, x, 29-78.
3. Shaw, H. B. Hyperpiesia and hyperpiesis. London, Frowde, Hodder and Stoughton, 1922, pp. 95-97; 131; 178.
4. Volhard, F. Die doppelseitigen hämatogenen Nierenerkrankungen. Berlin, Springer, 1918, p. 557.

UNUSUAL LODGMENT OF FOREIGN BODIES IN THE CONJUNCTIVAL SAC.

DR. W. GORDON M. BYERS.

MONTREAL, CANADA.

Read before the Montreal Ophthalmic Club, December 4, 1923.

While the following cases presented further interesting clinical features, only the changes that bear on the matter in hand will be noted in this brief communication.

A boy, aged thirteen years, was struck in the eye by a bullet from a powerful air-gun, fired at a distance of about thirty-five feet. Twenty minutes after the accident I saw a ragged triangular wound of the conjunctiva over the middle of the anterior third of the sclera, on the inner side of the globe; a very slight iridodialysis inwards; and an extravasation of blood in the anterior chamber, over the pupillary area and below (hyphema). Vision: fingers at six inches; tension, if anything, slightly increased.

Forty-eight hours later a detachment of the retina of moderate degree was made out over the inner half of the fundus. On my first examination the bullet was nowhere to be seen; and, as there was no sign of perforation or rupture, I thought the missile had merely struck the globe and passed on. But on my second visit a few hours later, while pulling up the upper lid the better to see the globe, the shot, perfectly rounded and of a diameter of about 4 mms., rolled into view from the upper fornix of the conjunctival sac.

About a year later I was called to see a girl, aged ten years, who also had been struck in the left eye by a bullet from an air-gun, fired, however, from a considerably greater distance. There was marked circumcorneal congestion and reflex irritation, a slight hyphema, and a small retinal hemorrhage below; but a point of impact could not be made out. Here too, the ball was nowhere to be seen; but a month later, when the eye was entirely free from irritation, a shot of the size previously described, emerged from the outer end of the conjunctival sac during my final examination of the case.

A third case was referred to our clinic by my colleague Dr. McAuley. The patient was a girl, aged ten years. A boy of seven, with whom she was playing, told her to turn her head and stand quiet so that he might shoot her in the eye with his new air-gun. She did as she was told, and the boy did shoot her in the eye. When seen, there was a broad iridodialysis in the lower-outer quadrant of the iris; and a string of hemorrhage across the pupil. No point of contusion or rupture of the globe could be made out, and the tension of the eyeball was normal. Later on a complete detachment of the retina on the temporal side was made out. The case was first examined by the family physician; but a few hours later the father, wishing to see the extent of the injury before the patient went to the hospital, pulled aside the lids. In doing so a round pellet of the usual size dropped into view from beneath the upper lid.

The interesting feature in connection with these cases was the unusual lodgment of the foreign bodies in the conjunctival sac. My explanation of the occurrence is, that the impact of the balls, tho not great enough to cause a rupture, was yet sufficient to flatten the globe and form an entrance in this way beneath the upper lid. Once within the cul-de-sac, the balls were held in position by spasm and by swelling of the parts. With the subsidence of the reaction came relaxation of the parts favorable to escape.

MATHEMATICAL VALUES OF THE SNELLEN NOTATIONS.

ALBERT C. SNELL, M.D., F.A.C.S.

ROCHESTER, N. Y.

The Snellen notation of visual acuity was not intended for a fractional expression of the proportion of full vision found. Its use in that sense gives a false impression. A series of test type, arranged on the plan of a unit of difference between the different sizes of the letters, is inferior to one arranged with the unit of proportion of one size to the letters next larger or smaller. For industrial estimations of impairment of vision an assumed zero and maximum of full vision, are necessary. Those recommended are 20/32 for the maximum and 20/320 for the zero of industrial vision. Read before the Buffalo Ophthalmological Club, Dec. 20, 1923.

Altho every ophthalmologist has a daily familiarity with the use of the Snellen test letters, until the workmen's compensation became general thruout the United States, there was rarely any occasion for considering the mathematical or percentage value of the various Snellen notations which express the various degrees of visual acuity. But since the advent of workmen's compensation, ophthalmologists everywhere are daily called upon to determine a percentage of visual impairment when an eye has suffered a permanent partial disability. Therefore an understanding of the mathematical value of various determined degrees of visual acuity as expressed by the Snellen notation becomes imperative.

There is prevalent a common, altho unfortunate, custom among ophthalmologists of using the Snellen notations for an observed degree of visual acuity as common, or as decimal fractions, these fractions being obtained by directly reducing the various Snellen notations, or expressions, to fractional forms, assuming that these notations express an equivalent fractional value. This practice inevitably leads to error. Professor Snellen himself pointed out the possibility of error which would result when any notation was reduced to a resultant fraction and gave four reasons why his notations should not be reduced. The last is thus stated by Snellen[1]; "the arithmetical series 0.1, 0.2, 0.3, etc., tends to produce wrong impressions of the proportional values of the visual acuity which are indicated by the test."

Dr. Green[2], who proposed in 1868 a system of test types in geometric progression, based on the Snellen standard, has also repeatedly stated that the Snellen notations should not be reduced. We quote Dr. Green on this point, and also quote his reason for this position. "These fractional forms (following Snellen) ought not to be reduced to lower terms, or to decimals. All systems of notation in which the acuity of vision (S-Schschärfe, or V-Visus) is estimated in terms of a unit assumed to represent normal vision are open to the criticism that they invite, or at least suggest, erroneous interpretation. Thus, a finding recorded in the form $V = \frac{d}{2d}$, when reduced to its arithmetical equivalent, $V = 1/2$ or $V = 0.5$, is not infrequently loosely construed as justifying the statement that vision is only one-half, or has fallen off to one-half, of the normal; and expert testimony embodying such erroneous and misleading evaluation is almost sure to be brought forward whenever a case of alleged impairment of sight is carried into a court of law for adjudication."

It will be seen from the above that the Snellen notation was not regarded as a numerical fraction either by its author or by Dr. Green. Careful writers have always designated it as an expression, or notation, the notation having the form of a fraction. Some writers have referred to it as the Snellen fraction, but no thoughtful writer or student considers, or has ever considered, the Snellen fraction, or expression, or notation as a true numerical fraction, having a fractional value equivalent to the reduced notation. Nevertheless despite the fact that the Snellen notations are not true numerical fractions they do have a mathematical value for they express various degrees of visual acuity. In order to determine this value let us first briefly consider the Snellen formula and analyze the numerical relationship which is expressed by the various notations.

As is well known in the Snellen formula which is $V = \frac{d}{D}$, V stands for visual acuity, d indicates the distance at which the test is made, and D indicates the distance at which the letter subtends an angle of 5 minutes, and in addition to this, the notation $\frac{d}{D}$ expresses a definite reciprocal relation between d and D. Thus in the use of the Snellen notation (as commonly expressed in terms of feet 20/20, 20/40, 20/60, 20/80, etc.) there is always a definite mathematical relation between the different notations. It may be observed that the 40-foot letter is twice as large, the 60-foot letter three times as large, and the 80-foot letter four times as large as the 20-foot letter, etc.; and when these test-letters are placed at the same distance for testing vision*, the visual angle formed by them has the same relationship, being respectively two, three, and four times larger than the standard visual angle of 5. Also it should be observed that these test letters which form the tangents of the visual angle, have each a definite size. The tangent or size of a 5 minute angle at 20 feet (a 20-foot test letter) is 0.891 centimeters, the 40-foot letter is twice as large, the 60-foot letter three times as large, etc. (See table for the complete sequence). The size of each successive and larger test letter is thus determined by employing this standard unit of measure, — a 5 minute angle, whose tangent at 20 feet is 0.891 centimeters. Therefore, in order to construct a 40-foot test letter this unit of measure, 0.891 cm., must be used twice, or the size of the letter must be 1.782 cm. In order to construct a 60-foot letter the unit of measure must be used three times, or the size of the letter must be 2.673 cm., etc. The 200-foot letter is ten times larger or 8.91 cm. in size.

In order to show the relationship between the various notations we present the following table. By consulting this it may be noted that whether we use the foot notation (the words notation or expression as used thruout this article mean Snellen notation or Snellen expression), the corresponding visual angle notation, or the corresponding size of test letter in centimeters, the relationship of the first notation to each succeeding notation is uniform. That is, compared with a

20-ft. test-letter or a 5 min. angle or a 0.891 cm. object (as the standard);
the 40-ft. test-letter or a 10 min. angle or a 1.783 cm. object is 2 times larger;
the 60-ft. test-letter or a 15 min. angle or a 2.675 cm. object is 3 times larger;
the 80-ft. test-letter or a 20 min. angle or a 3.567 cm. object is 4 times larger;
the 100-ft. test-letter or a 25 min. angle or a 4.458 cm. object is 5 times larger;
the 120-ft. test-letter or a 30 min. angle or a 5.349 cm. object is 6 times larger;
the 140-ft. test-letter or a 35 min. angle or a 6.237 cm. object is 7 times larger;
the 160-ft. test-letter or a 40 min. angle or a 7.128 cm. object is 8 times larger;
the 180-ft. test-letter or a 45 min. angle or a 8.019 cm. object is 9 times larger;
the 200-ft. test-letter or a 50 min. angle or a 8.917 cm. object is 10 times larger;
the 220-ft. test-letter or a 55 min. angle or a 9.801 cm. object is 11 times larger; etc.

It may be observed that these numbers or quantities are arranged in arithmetical progression, that is, the increase in each gradation is determined by adding the same quantity, or by using the unit quantity once, twice, three, four, five or more times whether it be a 20-foot measure, a 5 minute measure, or a .891 cm. measure. The series of numbers may, of course, be carried below the 5 min. angle as many persons can easily distinguish characters less than one-half this size; as for example, a 20/10 letter is clearly seen by many. This series may also be carried to the utmost lower range of visual perception, which is an object subtending an angle in the horizontal plane of 150 degrees or a 9,000 min. angle. However, the average normal as a standard for perfect vision has been established as a 5 min. angle; and, since central acuity is known to be confined to a 10 degree central angle, visual perception dropping rapidly from this point outward (see Dor), our lower range of visual acuity should not employ an angle which exceeds 10 degrees or 600 minutes.

Keeping in mind the arithmetical

*Vision thruout this paper refers to visual acuity only.

series above 20, 40, 60, 80 etc., it is obvious that we have used the 5 min. angle scale as a unit of measure to determine the size of each successive measurement. That the standard 5 min. angle should be regarded as a scale of measurement is definitely stated by Snellen himself[3]. "The 5 minute angle has been chosen as a standard scale,—." Now in mathematics a scale is a graduated standard unit of measure, therefore, in measuring vision by the use of this unit of measure we have proceeded just as we would to measure milk with a quart measure or to measure the length of a piece of cloth with a yard stick, etc.

In measuring vision and having in mind a percentage relation the first question that confronts us is, "what range shall we measure?" We may of course measure vision thruout the entire range of visual perception, from a 40″ angle—an object of this size is seen by many,—to the lowest degree of vision. This is only limited by the crest of the nose and the outer orbital rim which is an angle of 150 degrees. This is the range of scientific vision. Or we may confine our measurements within the range of economic vision; that is, limit our measurements and comparisons to that range of vision which is known to be useful in an earning capacity. Or we may expand our measurements so as to include the range of useful vision. Considerable useful vision remains beyond the point at which a person may be unable to earn anything. This range of useful vision is somewhat more limited than the ultimate limits of scientific vision, but covers a larger range of vision than does the economic range. A 10 degree angle should mark the limit of useful visual acuity. This point will be further considered later under the topic of zero vision. But the mathematical principles underlying the correct method of measuring any of these quantities or ranges of vision do not differ.

Assuming for the purpose of a mathematical demonstration that the range of economic vision lies between a 5 minute angle and a 55 minute angle, we must determine how the percentage of any part of vision falling within this range may be determined, since our problem is that of determining percentages. In order to determine the percentage of vision, or of anything else, we must remember two essential mathematic axioms;

1st, Percentage is proportion by the hundred and

2nd, Proportion is the relation of one part to another part, or the relation of a part to the whole, or when more than two numbers or quantities are compared, proportion is an equality of ratios.

When we attempt to determine the percentage of vision, we are dealing with the problem of determining the percentage relation of some given part to the whole of vision, and not with the relation of one part to another part. Therefore, it must be obvious that, in order to determine what percentage of the whole any given part is, the whole must be known. In making application of these principles to our problem of determining the percentages of vision, we must have in mind that we are dealing with an inverse ratio, that is the smaller the object seen the better is vision, but this does not alter in the least the principles for determining percentage. Even with an inverse ratio, as in vision, the whole range from 0 to the complete quantity must be known in order to determine the relation of a part to the whole.

Proceeding then with the solution of our problem, we have assumed that the range of economic vision is between a 5 min. angle and a 55 min. angle; therefore, in order to determine what percentage any part of vision is of the whole, we must compare this part with the whole, and obviously must divide the whole into equal parts. Granting the assumption that a 5 min. angle = 100 per cent vision and a 55 min. angle = 0 vision, the range of economic vision is 50 minutes. Therefore, when vision has been reduced to a 10 min. angle there is a decrease in visual acuity of 5 min., 5 from 50 = 45, and since 45 is 45/50 of the whole this must be 90 per cent vision; when vision has been reduced to a 15 min.

angle there is a decrease in vision of 10 min., and 10 from 50 = 40, and since 40 is 40/50 of the whole this must be 80 per cent vision, etc.

This principle may seem a little clearer when looked at from the point of view of visual loss. It is obvious that the per cent of loss of vision can only be determined when the measure of total loss is known. Again assuming that a 55 min. angle expresses a total loss of vision and a 5 min. angle expresses no loss, a 50 minute range of visual acuity evidently represents the whole range of vision; therefore, a percentage of loss of vision is a proportional relation of any part lost to the total—50 minutes: Thus when vision is reduced to a 10 minute angle there is a loss of 5 minutes, and since 5 is 5/50 of the whole there is a 10 per cent loss; a reduction of vision to 15 minute angle is a loss of 10 minutes, and 10 is 10/50 of the whole or 20 per cent loss, etc.

No principle of mathematics is violated when a part is compared with a part and their percentage relation is determined: For example the relation of 20 to 40 or 5 to 10 is 1/2, and the first is 50 per cent of the latter; but, if both of these represent parts only, and if one part is compared with another part this does not express the percentage relation of either part to the whole. The mistake of comparing a part with a part and regarding this relation as expressing a percentage relation to the whole is made by those who consider that, when vision is reduced to a 40-foot letter, vision has fallen 50 per cent. They reason that, since 20 is one-half of 40, or 5 is one-half of 10, therefore a reduction of vision from 20 to 40, or from a 5 minute angle to a 10 minute angle, is a loss of 50 per cent in vision. This process of reasoning, which attempts to determine the percentage relation of a part to the whole by comparing a part with a part, computes percentage by comparing the unit of measure with the part measured, ignoring the whole quantity, which procedure very obviously is erroneous.

The measurement of vision and the determination of a percentage value of any part of vision is just as simple as the measurement of distance. For example, for the purpose of measuring vision we use the unit of measure, the scale a 5 minute angle; for the measurement of distance we use the unit of measure, the scale, a foot rule or a yard stick. Now, in order to compare the method of using these two units of measure, and in order to determine the percentage relation of the various parts thus measured, let us consider first some measurements made with a foot rule and see what relationship we shall find. Assuming that we begin to measure an unknown distance, using the foot rule, and have measured off two lengths of the rule, we may correctly compare the length measured, 2 feet, with the length of the rule, 1 foot, and determine that the latter compared with amount measured is 1/2 or 50 per cent. But it would be ridiculous to conclude that because one foot is 1/2 or 50 per cent of two feet, therefore we have measured one-half or 50 per cent of a mile, and consequently conclude that 1 foot is 1/2 of a mile. A part compared with a part does not determine the percentage of either part to the whole. The same principle applies to the measurement of vision. Comparing the amount of vision measured with the unit of measure does not determine the percentage of that part to the whole; comparing a 5 minute with a 10 minute angle, or a 20-ft., with a 40-ft. letter does not determine the relation of this 10-minute-angle-part-of-vision to the whole, any more than does the comparison of one foot with two feet determine that one foot is 50 per cent of a mile because one foot is 1/2 of two feet. A quart of milk compared with two quarts is 1/2 or 50 per cent, but this does not mean that a quart of milk is 50 per cent of the entire can of milk, unless the can is a two quart one.

With these mathematic principles in mind, it is a simple matter to compute vision in terms of percentage if certain assumptions are granted as correct.

It is evident that, in order to determine a percentage relation of any part to the whole, the scale of measure employed in measuring must divide the

whole into parts having equal values. The measurement of vision is no exception. Depending on the choice of scale which is regarded as measuring vision by grades or measurements of equal value, two methods have been suggested; the first employs the arithmetic scale and the second employs the geometric scale.

Using an arithmetic scale having as a unit a 5 minute angle, which must assume that each measurement made with the use of this unit and scale has an equal value, and assuming that a 55 minute angle or a 220 foot letter is industrial blindness, we may compute vision or a loss of vision on a percentage basis. Since vision measured by a 20 foot letter = 100 per cent, no loss; and there are uniform measurements thruout the series to 220, a 55 minute angle being a total loss, each divided or measured part between 20 and 220 must express an equal unit of increase in size, and therefore any fractional part thus determined must have a direct numeric relation to the whole. On this basis the formula for determining percentage of vision for any Snellen notation within the range of economic vision is:

$$\text{Vision} = \frac{220\text{-}D}{200}$$, in which D = Snellen denominator.

For example, to compute percentages from this formula; for 20/20, $\frac{220-20}{200} = \frac{200}{200} = 100\%$; for 20/40, $\frac{220-40}{200} = \frac{180}{200} = .90$ or 90%; for 20/60, $\frac{220-60}{200} = \frac{160}{200} = .80$ or 80% etc.

Or, should one prefer to use visual angles as the basis, the same principles are apposite and the formula would be,

$$\text{Vision} = \frac{55-Sn.}{50}$$; Sn. being the size of angle which measures the recorded vision.

For example, for normal vision, a 5 minute angle, we should compute, $\frac{55-5}{50} = \frac{50}{50}$ or 100%; for vision measured by a 10 minute angle, $\frac{55-10}{50} = \frac{45}{50}$ 90 or 90% vision, etc.,

Computed from the point of view of visual loss the formula for foot letters would be:

$$\text{Loss of Vision} = \frac{D-20}{200}$$

For example, for 20/40, $\frac{40-20}{200} = \frac{20}{200} = \frac{1}{10}$ or 10% loss, for 20/60, $\frac{60-20}{200} = \frac{40}{200} = \frac{1}{5}$ or 20% loss.

Computed by using the visual angles to determine the percentage of loss, the formula would be:

$$\text{Loss of Vision} = \frac{\text{Visual angle} - 5}{50}$$

For example, 20/40 is a 10 minute angle, therefore expressed by the formula $\frac{10-5}{50} = \frac{5}{50} = \frac{1}{10}$ or —, a loss of 10%.

2nd example, 20/80 is a 20 minute angle, the percentage loss would be $\frac{20-5}{50} = \frac{15}{50} = \frac{3}{10} = .30$ or 30% loss, etc.

The use of an arithmetic scale as employed above assumes, as stated, that this scale divides the whole range of economic vision into units or grades each having an equal value. For example, this method assumes that vision falling from 20/20 to 20/40 represents a loss of the same value as that falling from 20/200 to 20/220, each grade being measured by a unit of equal numeric value. In the opinion of the writer, altho these divisional units do have equal numerical value, the assumption that they have equal visual value is not supported. Clinical and economic experience does not support the contention that the loss of vision from 20/20 to 20/40 is no more serious than a loss from 20/200 to 20/220. As a matter of fact the former degree of visual loss is considerable whereas the latter is trivial, being scarcely percep-

tible. Equal numerical quantities do not measure equal visual values. Primarily vision was determined and measured by the smallest distance separating two points so that each could be distinctly seen—the "minimum separabile." The standard test character, that having five limbs, each of which subtends an angle of one minute, is developed from this principle. Carrying out this same principle to each successive grade, that is, basing the gradation on the smallest increase in size of object that separates a character that can be just identified from that which can not be identified, we find that with each step in visual loss there is a constant increase in grade or size of visual angle which separates the distinguishable object and the indistinguishable. Clinical observation of a large number of cases shows that this increase in size of visual angle, a gradation which separates the different degrees of falling vision, is represented by numbers or quantities in *geometric progression*, so that the scale which measures or divides the whole range of vision into units of equal visual value must be a sliding scale. With this premise, our problem is the construction of a scale having gradations of equal visual value.

THE GEOMETRIC SCALE. It will be found that the scale constructed in geometric progression will divide the whole range of vision into gradations, each of which has an equal visual value compared with any other grade thruout the entire range of vision, and that such a scale will conform with the principles embodied in the Snellen formula, and also with the principles of proportion, being an equality of ratios. In the preceding part of this paper we quoted Snellen to the effect that he regarded his unit as a "scale" having "proportional values" for the various notations. Complying with this suggestion of Snellen so that any gradation on the scale shall have a uniform proportional value to every other gradation, we can not use an arithmetical scale, since there is not an equal proportional relation between successive grades or ratios in an arithmetic series. For example, the expression 20:30=30:40 is not true since 2/3 does not equal 3/4; but 20:40=40:80 does express an equality of ratios, the latter ratios being equal and geometric. In order to employ the principles of proportion as suggested by Snellen, equal ratios must be employed and this implies a geometric progression. The next step in the problem, then, is the construction of ratios which have equal visual value, and which express the smallest quantity separating a distinguishable character from an indistinguishable one.

A consideration of the following pertinent points in regard to the employment of equal ratios, that is of numbers in geometric proportion or progression, will show:

I. That the use of proportional quantities is not new.

II. That this method has received the approval of many scientific societies.

III. That the employment of the geometric scale correctly measures equal visual values.

In regard to the first point, since Snellen invented his method of measuring vision in 1862, all the older writers, including Snellen, used test letters in some proportional gradation. Snellen at first used the following successive numbers CC, C, LXX, L, XL, XXX, and XX. These ratios would be 1/2, 7/10, 5/7, 4/5, 3/4 and 2/3, which series show irregular ratios. Later he approved the geometric series as first suggested by Green in 1868. Proportional relations existed between the gradations of test-type which were suggested by Jaeger and by Giraud Teulon who were contemporaries of Snellen, but their ratios also were unequal. Furthermore it may be noted that nearly all the test letters which are in common use today are constructed in proportional gradation for some part of the series, altho it is not generally followed thruout. To Green is due credit for proposing that all test characters should be constructed in equal ratios thruout the entire series. Parenthetically it may be noted that there are no test charts constructed that have test letters in complete arithmetic series; for example, from

$$\frac{20}{20} \quad \frac{20}{30} \quad \frac{20}{40} \quad \text{to} \quad \frac{20}{450}$$

or thru the entire range of vision.

In regard to the second point test letters in geometric progression as presented by Green were very early approved by Landolt[4] and Javal in Europe, and by

Ewing, Williams[5], and others in this country. They were approved by the Fourth International Ophthalmological Congress, London 1872; by the Sociètè française d'Ophtalmologie[6], and by the American Ophthalmological Society in 1868[7] and again in 1903[8].

In regard to the third point, in order to show clearly the correctness of the principle of using letters constructed in regular geometric progression, for the purpose of measuring the value of different grades of vision, it would be well to keep in mind two points. The first, that from the earliest days of ophthalmology, even prior to the advent of the Snellen standard, different degress of acuteness of vision were indicated by the use of comparative or proportional expressions. Thus, the object seen by one person was compared with that seen by another, and when one person could see an object one-half the size of that seen by another, the former was said to have keenness of vision proportionately twice as good as the latter. The second is, that the same principle is employed for measuring other senses such as the muscle strength, hearing, or the sense of touch. Thus very naturally the use of this principle of comparison and proportion was employed to measure vision. The correctness of this principle in the measurement of vision will be best understood if we analyze this method and then construct a mathematic basis or formula which shall satisfy the requirements of determining the percentage of vision.

By the employment of test letters constructed in conformity with the Snellen standard, we may compare 20/20 with 20/40, that is 20:40, which is 1:2, and equals 1/2. Since vision is not completely measured by this simple ratio it is obvious that we must continue the comparisons until we have included the entire range of vision. If these comparisons are to be proportional, all ratios must be equal, since essentially proportion is an equality of ratios. To complete the series in equal ratios we would have 20:40=40:80=80:160=160:320=320:640, etc. Now these ratios of 1/2 are found to be too great for the practical testing of vision, therefore, a smaller ratio than 1:2 or 1/2 must be chosen. It being found that characters separated by the gradation 20/20 to 20/40 are too easily distinguished, a scale of gradations smaller than 1 to 2 apparently is necessary to measure these finer degrees of vision. Green in 1867 employed the ratio of 7:10 or 7/10, and in 1868 he suggested the ratio the $\sqrt[3]{1/2}$ as the common ratio. This was found to be small enough for all practical purposes for testing vision and has met with general approval since.

The $\sqrt[3]{1/2}$ or $\sqrt[3]{.5}$ is .795, approximately a ratio of 8 to 10. Using this ratio to select numbers decreasing in size, we shall have a series of numbers in equal ratios. Each smaller number is obtained by multiplying the next larger one by .795. For an ascending series we take the reciprocal of 8:10, that is 10:8, which is approximately 1.26. Using this as a common factor, ascending ratios are constructed which will also give a series of equal ratios in geometric progression. Each larger number in the series is obtained by multiplying the next lower by 1.26. This is the ratio now in common use in constructing all of our test-types. The tangent of a 5 minute angle at 20 feet is .891 cm. The next larger letter in the geometric series is made by multiplying this by 1.26. Applying this ratio, beginning at 20, we obtain numbers in equal ratios as follows: 20, 25, 32, 40, 50, 64, 80, 100, 126, 160, 200, 250, 320, etc., a series of numbers in common daily use in the measurement of vision and conforming to the Snellen standard*.

The use of this geometric, proportional scale is founded on the principle

---

*To illustrate how a geometric series is developed and constructed in a smaller ratio than 1:2, the following is added. Let a series of numbers in geometric progression be expressed thus

1—2—4—8—16—32—64—etc.

Now if we desire to have a geometric mean between any two of these numbers it is evident that this is that number which when multiplied by itself will give the next quantity, evidently the square root of that number: For example the geometric mean of 1 and 2 is $\sqrt{2}$. This complete series would then be

1, $\sqrt{2}$, 2, $2\sqrt{2}$, 4, $4\sqrt{2}$, 8, etc.

Should we wish to have a still smaller ratio between 1 and 2 so as to have a lesser gradation between 1 and 2, we must find the two quantities which are the means in a simple proportion of which 1 and 2 are the extremes. This would give a series of equal ratios as follows:

1, $\sqrt[3]{2}$, $\sqrt[3]{4}$, 2, $2\sqrt[3]{2}$, $2\sqrt[3]{4}$, 4, $4\sqrt[3]{2}$, $4\sqrt[3]{4}$, 8, etc., or
1., 1.26, 1.5875, 2., 2.52, 3.175, 4., 5.04, 6.35, 8., 10.08, 12.7.

Constructing these ratios to conform with the Snellen notation we multiply each by 20, as this does not change the value of the ratio, and continuing the ratio to 10 degrees we would obtain approximately the following numbers:

20, 25, 32, 40, 50, 64, 80, 100, 126, 160, 200, 250.

that various degrees of vision are measured in steps or grades, each step representing the smallest increase in size of characters from one grade to the next which represents the difference between characters which just cannot be discerned and those that just can be identified. For example, if in testing vision a person cannot identify the 20/20 line of test letters, then one must determine the smallest increase in size which makes it possible for him to identify them. When the 20 foot line just fails to be recognized, it is found, in the great majority of cases that the 25 foot line can be clearly identified. When the 25 foot line just fails to be recognized the 32 foot line of letters can be clearly seen, etc. Thus it is obvious that a grade of 20 to 30, the unit commonly employed in the arithmetical scale, is too great for the testing of the finer and higher degrees of acuity. But when vision falls considerably, using the same arithmetical scale, a range of 10 feet or 2½ minute angles, these gradations are found to be far too small to mark the difference between characters just indiscernible and those just discernible: For example, when vision falls so that 20/100 cannot be identified, such a person cannot identify the test letters in the 20/110 line, nor can he identify those in the 20/120 line, but can usually identify those as large or larger than 20/126. Thus the grade from 20/100 to 20/126 represents the smallest increase in size of test letters between those characters just failing of recognition and those just identified.

Experimentation and clinical data will establish the truth of the fact that thruout the entire range of vision, the gradations between those characters which cannot be identified and those which can be just identified constantly becomes proportionately greater; so that the difference in gradation between the test letters which cannot be identified and those which can just be identified is constantly increasing in size as vision falls. Thus the scale which measures vision by this standard is a sliding one, with each gradation proportionately larger than the preceding grade. The proportions in such a scale may be expressed by equal ratios, and the common ratio for all is 1.26. This ratio was chosen as standard because it expresses the smallest quantity between visual angles which represent characters which are just identified and those which cannot be identified. By using this principle, vision is measured by numbers which are in true geometric progression and each gradation expresses a unit of vision of equal value.

Considering that each grade in this scale represents the minimum unit of measure so that each grade has an equal visual value, the determination of a percentage value for any measured part of vision is very simple. One must first know what degree of vision shall be established as zero vision and then determine the number of grades or steps there are between this zero point and 100 per cent vision. The percentage will be expressed by the relation of the number of gradations in the descending scale required to measure the degree of vision to the whole number of unit gradations which measure the entire range of vision. Obviously it is essential to establish what may reasonably be regarded as zero vision and also to establish a standard for perfect vision.

Zero Vision: Visual acuity extends from a central point of fixation to the remote periphery, a range in the horizontal meridian of 150 degrees, but the area of acute vision, as is well known, is limited to a small central area. Dor[8] has shown that a spot 5 degrees eccentric has an acuity of only 1/4, and that the macular area proper covers approximately 10 degrees. Therefore, considering only the range of most acute vision, one may fairly assume that an angle of 10 degrees should be regarded as defining the limits of useful central vision. Ten degrees =600 minutes; a 600 minute angle is equivalent to visual acuity of 20/2400 Sn. or 1/120. However, the macula lutea proper is only 1/8 of the macular area*, therefore this very central area is covered by an angle approximating an 80 minute angle which is equivalent to a visual acuity of 20/320 Sn. Altho a person is not totally blind so long as there is light perception, or so long as he has ability to count fingers at a foot, approximately 1/120, or a 10 degree angle, zero vision for economic purposes must be an angle smaller than

*Several authorities give the dimensions of the macular region as approximately 2 mm. and the macula lutea as .25 mm. This shows that the size of the macula lutea is ⅛ of the macular region.

this. Therefore, for the measurement of industrial vision, we have suggested that an 80 minute angle or 20/320 Sn. should be regarded as zero vision, this being the angle which corresponds to the largest angle confined to the macula lutea. And further, it is chosen because this amount of vision has been found from practical clinical experience to be the lowest limit of economic vision. In many instances the ability to earn ceases before this point is reached, so that industrial blindness may be represented by a percentage somewhat better than zero.

From an industrial point of view one does not find, as a rule, any loss to earning ability for loss of visual acuity between 20/20 and 20/30, therefore, in an economic sense one may consider that there has been only a trivial loss so long as vision does not fall below this degree of acuity. Thus the range of economic vision may be regarded as beginning at 20/30 and falling in gradations measured by equal ratios from 20/32 to 20/320.

DETERMINATION OF PERCENTAGE VISION BY USE OF THE GEOMETRIC SCALE.

Granting the above premises that there is no loss in the practical usefulness of vision until acuity falls to 20/32, and that 20/320 represents zero economic vision, and having determined that gradations of vision only have equal unit value when measured by a geometric scale, and employing the common ratio of 1.26, we find that there are just ten gradations from a no loss to a total loss. Therefore each gradation must be 1/10 of the whole or 10 per cent.

The use of a geometric scale to compute percentage does not differ in principle from the use of an arithmetic one. In order to compute the percentage of any part to the whole, the relation of this part to the whole must be determined and not the proportional relation of one ratio to another ratio. For example, the ratio 20:40 is 1/2, but this does not mean that vision has fallen off one half, because this process simply compares one part with another part. The absurdity of this reasoning is seen by continuing this same ratio employing another equal ratio. For example 20:40=40:80; that is 1/2=1/2. Thus, if vision in the gradation between 20 and 40 is 1/2, that between 40 and 80 is another half, and therefore 20/80 must represent the whole of vision, or inversely a total loss. It can scarcely be disputed that 20/80 does not express blindness from any point of view, but this process of reasoning must necessarily conclude that 20/80 is blindness.

The percentage of any part of vision then, measured by this proportional, progressive unit scale, is the relation of any part measured by this unit scale to the whole measured by the same scale. The following simple formula expresses this relationship:

$$\text{Percentage of vision} = \frac{R-P}{R}, \text{ in which}$$

R equals the number of ratios employed to measure the entire range of vision and P equals the number of gradations or units which measure any partial degree of visual acuity.

For example, to measure economic vision 10 ratios are employed to measure the entire range of economic vision, therefore R always equals 10. To determine the percentage of 20/40; since 20/40 is the 1st ratio between 20/30 and 20/40 P=1, therefore employing the formula,

$$\left(V=\frac{10\text{-}1}{10}\right)$$ which is 9/10, we find that 20/40 is .9 or 90% vision. To determine the percentage of 20/50, — since this degree of vision is measured by two equal ratios, 20/50 being the second gradation, P= 2, therefore $\frac{10-2}{10}$=8/10 which is .8 or 80% vision, etc.

A percentage loss of vision is expressed by the simple formula: Percentage loss of vision =P/R, in which P and R are the same as above.

For example, a percentage loss of vision for 20/40 is thus determined. 20/40 is the first step or gradation in the series, thus one ratio is employed and P=1, therefore V=1/10 or 10% loss in vision. For 20/50 there is the loss of two, or this degree of vision is measured by 2 equal ratios therefore 20/50=2/10 =a 20% loss of vision, etc.

The following table shows the Snellen notations arranged in geometric progression, the common ratio for each ratio being 1.26 approximately, also showing the size of corresponding visual angle and of test letter; and finally it

shows the fractional gradations with percentage of vision and of visual loss for each gradation from 20/32 to 20/320.

Constructing a graph by means of the employment of these equal ratios, using the common ratio 1.26, will show that vision falls gradually and in a parabolic curved line, and that there may be read off from this graph a percentage for any and every degree of visual acuity which is expressed by any Snellen notation lying between these extremes.

The continuous line shows visual acuity values using the geometric scale from 20/32 to 20/320. The broken line shows visual values using a numeric scale from 20/20 to 20/220.

A series of common ratios might be employed covering a range of vision from 20/20 to 1/120, the scientific range, or any other chosen range, but the percentage would be obtained by employing the same method as has been described above. For example, we could use similar ratios to cover the range from 20/25 to 20/2400, the latter being equivalent to a ten degree or 600 minute angle. This would measure off 20 equal ratios or gradations and each step therefore would be 1/20 or 5 per cent of the whole range. Thus a 20/40 Sn. would in this series be 90 per cent vision.

The measurement of the entire range of complete vision from 20/20 to 1/120, the scientific range, is more complex since normal visual acuity falls rapidly from the central point to the periphery, as is shown by Dor. The computation of visual values for this range requires the use of the additional factor of the normal decrease in visual acuity at different degrees from the center. This may be presented later in another communication, but the purpose of this paper

PERCENTAGE TABLE OF VISION CONSTRUCTED BY EMPLOYING THE COMMON RATIO 1.26, FROM 20/32 TO 20/320.

Gradation or number of ratios	Snellen equal ratios	Size of visual angle at 20 feet	Size of test letter at 20 feet	Fractional part of vision	Percentage of vision	Percentage of visual loss
Slight	20/20	5	.891	10/10	100	0
	20/32	7.9	1.413	9.5/10	95	5
1						
	20/40	10	1.783	9/10	90	10
2						
	20/50	12.5	2.242	8/10	80	20
3						
	20/64	16.7	2.826	7/10	70	30
4						
	20/80	20	3.566	6/10	60	40
5						
	20/100	25	4.484	5/10	50	50
6						
	20/126	33	5.642	4/10	40	60
7						
	20/160	40	7.132	3/10	30	70
8						
	20/200	50	8.913	2/10	20	80
9						
	20/250	62.5	11.284	1/10	10	90
10						
	20/320	80	14.264	0/10	0	100

has been the consideration of the range of economic vision, its mathematic measurement and the values of the Snellen notations.

SUMMARY.

1. The reduction of the Snellen notation to an equivalent numerical fraction expresses an erroneous proportional visual value. It is so stated by Snellen himself and by Green.

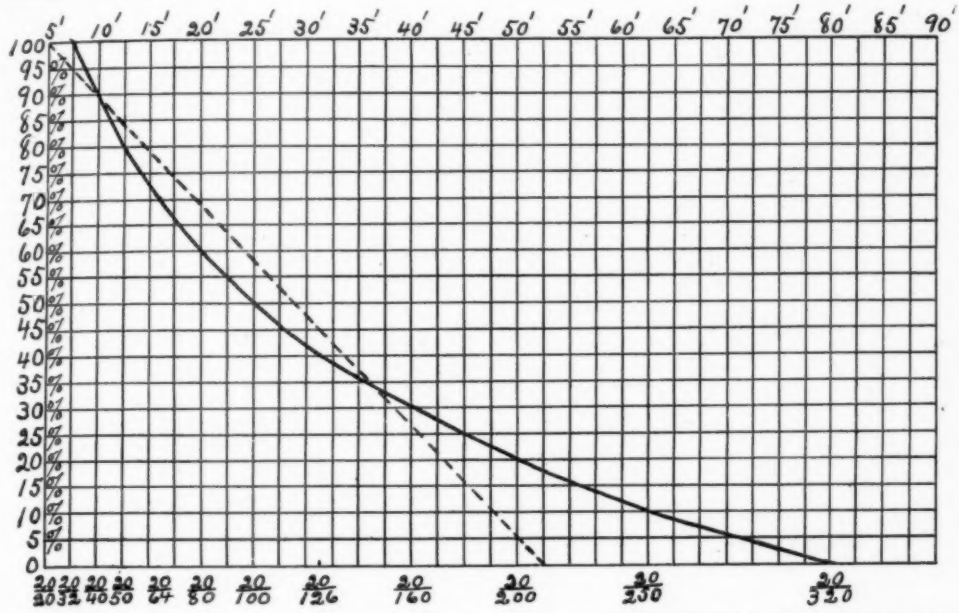


Fig. 1.—Graph of visual values. The continuous curve shows visual acuity using the geometric scale 20/32 to 20/320; the broken line shows visual values by the numeric scale 20/20 to 20/220. The figures at the top indicate visual angles in minutes. The figures on the left give percentages, those at the bottom the vision by Snellen notations.

2. The Snellen standard is a unit scale of measurement.

3. A percentage relation of any part of vision is determined by the relation of a part to the whole, the whole being measured by units of measure having equal value.

4. The entire range of vision is measured in units of equal value when the principle of proportion is employed. This requires the use of equal ratios having the smallest ratio to one another which is equivalent to differences in size of characters which separate the just distinguishable from the indistinguishable for different degrees of vision.

5. The common ratio of 1.26 for an ascending scale has been found to satisfy this difference thruout the entire range of vision. Test letters constructed on this principle are in geometric proportion or progression.

6. The percentage of vision for any Snellen notation is determined by the number of unit ratios of equal value which measure any part of vision to the number of unit equal ratios which measure the whole range of vision from zero to standard normal.

7. The range of economic vision may be regarded as limited by a range from 20/32, a very slight or no loss, to 20/320, a total loss for industrial purposes altho not scientific blindness.

8. There are just 10 equal ratios between 20/32 and 20/320, therefore each ratio is equivalent to a reduction in vision of 10 per cent.

BIBLIOGRAPHY.

1. System of Diseases of the Eye. Norris and Oliver, Vol. II, p. 15.
2. Trans. Amer. Ophth. Soc. Vol. X, p. 650-653.
3. Norris and Oliver. Vol. II, p. 14, 4th paragraph.
4. Refraction and Accommodation of the Eye, p. 230.
5. Trans. Amer. Ophth. Soc. Vol. X, p. 189.
6. Annales d'Oculistique, 1904, May, p. 400.
7. Trans. Amer. Ophth. Soc. 1868.
8. Arch. f. Ophth., Vol. XIX. Also Lohman, Disturbances of the Visual Functions, p. 43.

LIPEMIA RETINALIS.

IRVING I. MUSKAT, M.D.
Former Resident Ophthalmic Interne, Cook Co. Hospital.

CHICAGO, ILLINOIS.

This is the report of a case studied and treated in the Cook County Hospital, service of Drs. G. F. Suker and C. G. Darling; with references to the literature of the subject. With diabetes there was a history of the patient having been a heavy drinker. His urine became free of sugar. But he relapsed a few weeks after leaving the hospital and returned for treatment, when insulin was used. The appearances of retinal lipemia were recognized during his second residence in the hospital; and this condition was carefully watched and the blood changes investigated. Read before the Chicago Ophthalmological Society, Nov. 19, 1923. See page 296.

Lipemia retinalis is the name given by Heyl[1] in 1880 in describing a peculiar ophthalmoscopic picture accompanying severe juvenile diabetes mellitus. The general features of the fundus embody certain distinct findings more or less common to most cases subsequently reported. Root and Gray[2] have collected 26 cases from the literature and report 2 others. McCann[3] reports another, making 29 to which we add the following case, making (with the case of Hardy[30], p. 39) a total of 31 reported in the literature.

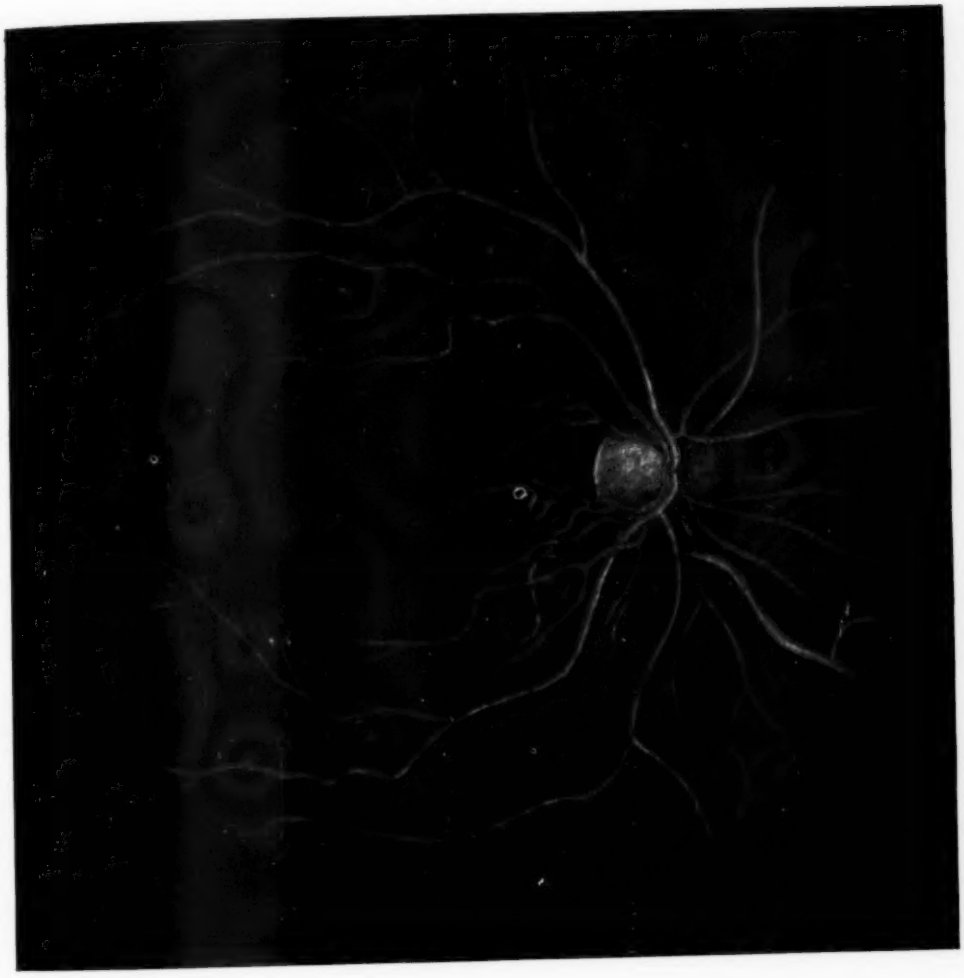
Our patient, a male, aged 33, an electrician, entered the Cook County Hospital July 10, 1923, with pronounced symptoms of diabetes, which had been present for six weeks. The past history revealed the fact that he had been a heavy whiskey drinker for many years, but denied venereal infection. On physical examination his liver was found to be enlarged one finger's breadth below the costal margin. There was decreased pain sensation over the distal one-third of his left foot and toes, palpable epitrochlear glands, and a moderate emphysema of his lungs. The Wassermann reaction was negative and the blood showed 4,200,000 reds, 8,000 whites and 85% hemoglobin.

The patient was placed on a normal diet to estimate the amount of sugar and urine excretion, which was 3,200 cc. urine and 94.44 gms. sugar in 24 hours. The blood sugar estimation at the time of entrance showed 250 mgms. per 100 milliliters of blood, as compared with the normal 100 mgms. He was then put on a Newburgh diet and on August 31 he left the hospital, sugar free and feeling well.

He was forced to return on September 22 with a return of his diabetic symptoms but on a careful calculated dietary regime and insulin, which was gradually increased to 12 units three times daily by November 3, he gradually improved. On that day, however, he suddenly became ill with an epigastric burning sensation, coarse tremor of the hands and lacrimation, lasting about ten minutes. This reaction, however, was not thought to be due to a hypoglycemia, since his blood sugar just before and after this reaction was 169 mgms. The patient had several recurrences of these peculiar attacks and gradually developed pronounced symptoms of a paranoid dementia precox, which remained until his release, against advice, on November 23.

The lipemia retinalis was discovered on October 24, and gradually diminished until no trace could be detected on November 12. How long the condition was present prior to October 24 we are unable to state. On November 4th it was just possible to barely distinguish the veins from the arteries; but these were readily differentiated on November 8th.

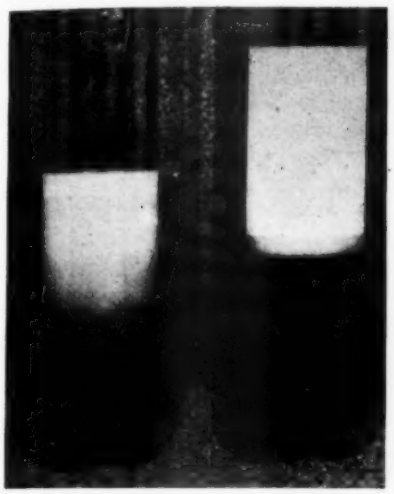
The first ophthalmoscopic examination revealed a fundus of a very light color, the vessels all of the same milky color, becoming a little more cream colored towards the periphery and more whitish near the disc. The veins and arteries had a flattened appearance, as if carved out, or set in relief; and of the same width, about twice the normal caliber, so that the veins and arteries could not be differentiated from each other. The discs were well defined, were light in color, and not atrophic. The disc vessels were darker in color, while in the fundus periphery the vessels could be traced to their finest subdivisions. There were no inflammatory retinal lesions, hemorrhages or the like; the vessels were not tortuous; the tension of both eyes was normal, and the vision was



APPEARANCE OF EYE GROUND IN LIPEMIA RETINALIS. CASE REPORTED BY DR. I. I. MUSKAT. SKETCH BY DR. HALLARD BEARD

20/20 in each eye. The accompanying color plate, from a sketch made by Dr. Hallard Beard shows the fundus several days after its recognition, and is therefore a little darker than described.

The blood drawn from the patient on October 24 was that of a chocolate gray of malted milk, which upon standing separated into three layers, a milky white opaque serum on top, a dark red-brown lower layer and a small middle layer, of a hue between these two. These are well shown in the accompanying photographs, the first specimen drawn October 24 and the other 4 days later.



A B

Fig. 1.—Separation into layers of blood drawn from case of retinal lipemia. A. October 24. B. October 28.

The lipemic appearance of the blood gradually diminished in intensity, and only a faint suggestion remained at the time of his release. Some of the droplets and granules from the serum as seen under the microscope in a filmed preparation stained with osmic acid, showed the presence of fat. The low percentage of blood fat, as compared with previously reported cases, is undoubtedly due to the result of the insulin therapy.

TABLE III.

10- 9 to 10-16	2 units of insulin twice daily
10-17	0 units
10-24	5 units of insulin twice daily
10-26	10 units of insulin thrice daily
10-30	12 units of insulin thrice daily
11- 3	12 units 2 doses with 20 Gms. sugar after each dose. Epigastric Pain, Tremor, Paranoid Psychosis.
11- 4	8 units twice daily until release.
11-10	Patient out on pass 24 hrs.
11-11	30 units on return. (Patient in impending coma).

Mariet of Edinburgh in 1799 described the lipemic blood of diabetics as having a characteristic grayish color, and the separation of such blood in layers has also been described by Naunyn in 1899, and by others since. There has been considerable speculation regarding the lipemic nature of the blood in diabetes. Altho there is an increase in the blood

TABLE I.

	10-29	10-30	11-1	11-2	11-3A	11-3B	11-7	11-12
Total Fat	2461	6040	1838	3750	1768	3990	2530	3150
Cholesterol	1120	925	894	886	794	785	743	736
Sugar	290	240	273	286	162	222	316	316
CO_2 Tension	40.4	49.1	68.2	68.8	43	56	68	68

A. Taken at 11:00 a. m. B. Taken at 3:00 p. m.

Total Fat—Mgm. per 100 cc. Blood (Bloor Method).

Cholesterol—Mgm. per 100 cc. Blood (Bloor Method).

(Determination made by H. Ets., Chemistry Dept. Univ. of Ill.)

TABLE II.

Grams of Protein, Fat, and Carbohydrate.

	10-3	10-8	10-11	10-18	10-23	10-26	11-7
Fat	150	145	180	180	180	180	120
Protein	55	45	50	50	50	50	50
Carbohydrates	10	10	30	25	20	40	40

fat content in all diebetics, all diabetics do not show a lipemia or a lipemic retinalis. Wishart[4], in an analysis of blood lipoids in diabetic animals and patients, has shown that the plasma may contain a great amount of fat and still be clear. Foster[31] in 1878 states that he produced creamy looking blood by the addition of acetone to healthy blood, and that this condition is not due to an excess of fat as its appearance would seem to indicate. These results were, however, not corroborated by Sanders and Hamilton[32] a year later, but it is an interesting fact that these lipemia retinalis subjects have a great amount of acetone in their urine.

Observations of the microscopic specimens of the serum revealed myriads of refractile granules. Not all stained with osmic acid, a fact which has given rise to the question regarding their lipoid relation. Turney and Dudgeon[5] stained filmed blood preparations with Scharlach R, which gave a positive fat test where osmic acid was unsatisfactory. It has been suggested that some of these granules are covered by an albuminous envelope, which prevents their staining with some of the fat stains. Futchner[6] added strong acetic acid to the granules and found that they did not stain and that they did not change, indicating thereby, that these granules were not those of polymorphonuclear or eosinophilic leucocytes. He also treated the serum with ether and found that only part of the turbidity cleared up. Dr. Bernard Fischer[7] states that the lipemic serum from a patient, reported separately by Reis[8] as a case of lipemia retinalis, when treated with ether became clear and transparent, and took on a yellowish color. He defines lipemia as a blood which will clear with ether, the extract of which reveals fat.

Lipemia retinalis, as it occurs in diabetics, is usually seen in young light-haired males, under 30 years of age, altho Moore reports a case of a woman aged 25 years; Gray and Root[2] reported a case in a woman aged 50.

This rare condition with the exception of one atypical case of leukemia reported by Wagener[9], has only been seen in diabetics. The fundus in this case, however, was considerably modified by other changes. Altho single cases of lipemia have been reported in phthisis, malaria, phosphorus poisoning, pneumonia, peritonitis, and a long list of other diseases, as outlined by Fischer, this author states that genuine lipemia occurs only in diabetes and chronic alcoholism. The latter fact explains the reason for the rarity of lipemia retinalis reported, which is also borne out from a practical standpoint, by Köllner[10] and others who have had a vast experience in eyeground examinations in other medical conditions. At the Cook County Hospital of Chicago, where an enormous number of eye examinations are made, this is the first case to be recorded.

In Wagener's case of leukemia, there was 5% total fat in the blood, and it is suggested that the rapid destruction of radium, with which this patient was treated, may have produced a transient lipemia. In this connection it is interesting to note that Boggs and Morris[11], in their studies on artificial lipemia in rabbits, suggest the possibility of lipemia in rapidly developing anemias. From a study of previous cases it is very evident that the percentage of fat in the blood must rise to a certain degree before fundus changes manifest themselves. Heine[12] believes that lipemia retinalis only occurs when the fat content of the blood reaches 5%, definitely recognizable at 8%, occasionally as high as 15% to 18%, compared to the normal 0.6 to 0.7%, but this has not been absolutely borne out in subsequent cases.

Associated with this rise in fat content, there is an increase in the cholesterol content of the blood, which is normally 0.4 to 0.6%. At the Mayo clinic, in a study of lipemia retinalis, it has been noted that ophthalmoscopic changes become evident when the blood fat exceeds 4%, and rapidly disappear below that amount. On the other hand McCann[3] mentions a case in which lipemia retinalis was absent in a diabetic patient showing 8.9% blood fat, and 0.78% cholesterol, and in another patient there was an increase of blood fat coincident with the disappearance of the lipemia retinalis. Czerny[10] observed no lipe-

mia retinalis in dogs after the injection of fat into the jugular vein.

From these observations it seems evident that there must be some other factor outside of lipemia to produce lipemia retinalis.

There has been much discussion regarding the cause for the appearance of the retinal vessels in this condition. The flatness and increased width, together with the milky color of the vessels, has been attributed to the opaque color of the blood circulating in them, but McCann believes there is another factor, since he found a disappearance of the lipemia retinalis in spite of a milky blood, coincident with an increase in fat content from 9.5% to 10.5%. He therefore believes that the whiteness of the retinal vessels may be due to a film of fatty lymph in the perivascular spaces, or to fat deposits in the adventitia, altho no changes were found in the blood vessels of the skin under the microscope. In further consideration of this subject it is interesting to note that Foster[31] artificially produced creamy looking blood by the addition of acetone to the healthy blood.

Regarding the postmortem eye findings in lipemia retinalis, there is one significant fact gathered from the few reports; namely, that in all cases where microscopic sections were made, by Reis[8], Fraser[13], Heine[12], Hertel[14] and Köllner[10], there were no abnormal changes, either of the blood vessels or posterior part of the eye.

Nearly all the cases which have been followed, and within approximately five months after the appearance of a lipemia retinalis, have terminated fatally. The detection of an existing lipemia retinalis, therefore is important; since, aside from a clinical analysis of the blood for lipemia, the eye picture furnishes the only other evidence of its existence. Regarding vision, lipemia retinalis in itself does not alter the acuity of vision.

In conclusion, I wish to state that a clear understanding of this condition can only be reached thru a careful blood analysis for fat, cholesterol and ketone body content in all cases of diabetes, together with a routine ophthalmoscopic examination, and especially thru further postmortem microscopic studies whenever available.

The eye department of the Cook County Hospital is greatly indebted to Drs. Miller, Rappaport and Jackson of the medical department for the opportunity to use their records and observe this case; and to Dr. Kendall (Cook County Hospital) and Mr. Ets of the University of Illinois, for the chemical analysis. We also wish to thank Dr. Beard for his excellent drawing.

BIBLIOGRAPHY AND REFERENCES

1. Heyl, A. G. Remarks on Lipemia Retinalis Occurring in a case of Diabetes Mellitus. Philadelphia Med. Times, v. 10 (March 27) 1880. Intraocular Lipaemia, Trans. Amer. Ophth. Soc., v. 3, p. 54 (July) 1880.
2. Gray, H. and Root, H. F. Lipemia Retinalis. Jour. Amer. Med. Assoc., v. 80, p. 995, (April) 1923.
3. McCann, W. S. Lipemia Retinalis. Johns Hop. Hosp. Bull., v. 34, p. 302, Sept. 23, 1923.
4. Wishart, M. B. Lipemia. I. Analysis of Blood Lipoids in Diabetic Animals and Patients. Jour. Metab. Research., v. 11, p. 199, Aug., 1922.
5. Turney, H. G. and Dudgeon, L. S. A Case of Intraocular Lipemia Associated with Diabetes. Jour. Path. and Bact., v. 11, p. 50, 1906.
6. Futchner, T. B. Lipemia in Diabetes Mellitus. Jour. Amer. Med. Assoc., Oct. 21, 1899.
7. Fischer, B. Ueber Lipemia und Cholesteranie, sowie über Veränderungen des Pankreas und der Leber bei Diabetes Mellitus. Virchow's Arch. f. Anat. u. Phys., v. 172, p. 1903.
8. Reis, W. Zur Kentniss eines bisher kaum beachteteten Augenspiegelbildes bei Lipemia in Folge schwerer Diabetes. Arch. Ophth., v. 55, p. 437, March 24, 1903.
9. Wagener, H. P. Lipemia Retinalis; Reports of Three Cases. Amer. Jour. Ophth., v. 5, p. 521, July, 1922.
10. Köllner, K. Lipemia. Centralbl. f. prakt. Augenheilk., v. 34, p. 212, July, 1910. Mitteilung über Lipemie. Klin. Monatsbl. f. Augenheilk., v. 49, p. 109, July, 1911. Lipemia Retinalis. Ztschr. f. Augenh., v. 27, p. 411, 1912.
11. Boggs, T. R. and Morris, R. S. Experimental Lipemia in Rabbits; Jour. Exp. Med., v. 11, p. 553, 1909.

12. Heine, L. Ueber Lipemia Retinalis und Hypotonia Bulbi in Coma Diabeticum. Klin. Monatsbl. f. Augenh., v. 44, p. 451, Dec., 1906. Augenspiegelbefunde bei diabetischer Lipemia. Deutsch. med. Wochnschr., v. 33, p. 95, Jan. 10, 1907.
13. Fraser, T. R. Lipemia in Diabetes Mellitus. Brit. Med. Jour., v. 1, p. 1205, May 23, 1903.
14. Hertel, C. Mikroskopische Präparate und Abbildungen von einen Fall Lipemia Retinalis. Ztschr. f. Augenhk., v. 21, p. 551, May, 1909.
15. Starr, L. Lipemia and Fat Embolism in Diabetes Mellitus. Med. Rec., v. 17, p. 477, May 22, 1880.
16. White, W. H. Guy's Hosp. Gaz., v. 16, p. 295, July 19, 1902; A Case of Diabetic Intraocular Lipemia in Which the Blood Was Examined During Life; Lancet 2, 1007, Oct. 10, 1903.
17. Krause, P. Ueber Lipemia in Coma diabeticum. Verhandl. Cong. f. Uni. Med., v. 23, p. 521, April 26, 1906. La Lipemea dans le Coma diabetique; Sem. Med., v. 26, p. 225, May 9, 1906. Zur Symptomalogie des Coma diabeticum. Deutsch. med. Wchnschr., v. 33, p. 95, Jan. 10, 1907.
18. Marx, E. Ein Geval von Lipemia Retinalis. Hedere Tyjdschr. v. Geneesk, v. 2, p. 808, Sept. 21, 1907.
19. Czerny, v. Ueber die klinische Bedeutung der Fettembolie. Berl. klin. Wchnschr., v. 12, pp. 593, 605. Nov. 1 and 8, 1875.
20. Stoerk, E. Ein Fall von hochgradiger Lipemia bei juvenilem Diabetes Mellitus; Wein. med. Wchnschr., v. 61, p. 1297, May 13, 1911.
21. Darling, C. G. Retinal Lipemia in Severe Diabetes. Arch. of Ophth., v. 41, p. 355, 1912.
22. Ulbrich. Lipemia Retinalis. Tr. Ophthal. Gesellsch. in Wien., Nov. 11, 1912. Ztschr. f. Augenh., v. 29, p. 83, 1913.
23. Moore, R. F. Diabetes in Relation to Diseases of the Eye. Tr. Ophth. Soc. U. K., v. 40, p. 85, 1920.
24. Moore, R. F. Lipemia Retinalis. Lancet, v. 1, p. 366, Feb. 20, 1910.
25. Williamson, R. T. Ophthalmoscopic Appearances in Certain Rare Cases of Diabetes, Brit. Med. Jour., vol. 1, p. 120, Jan. 22, 1921.
26. Cohen, M. Report of a Case of Lipemia Retinalis with Hypotony in Diabetic Coma. Arch. Ophth., v. 50, p. 247, May, 1921.
27. Hardy, W. F. Lipemia Retinalis. Trans. Amer. Ophth. Soc., v. 19, p. 229, June 15, 1921.
28. McGuire, H. H. Observations in a case of Lipemia Retinalis. Trans. Amer. Ophth. Soc., v. 20, p. 235, May, 1922; Amer. Jour. Ophth., v. 5, p. 862, Nov., 1922.
29. Benedict, W. L. Discussion of McGuire's paper. Tr. Amer. Ophth. Soc., v. 20, p. 241, May, 1922.
30. Hardy, William F. Lipemia Retinalis, Effects of Insulin. Amer. Jour. Ophth., v. 7, p. 39, Jan., 1924.
31. Foster. Brit. Med. Jour., Jan. 19, 1878.
32. Hamilton. Edin. Med. Jour., July, 1879.

NOTES, CASES, INSTRUMENTS

OCULOMOTOR PALSY WITH PARENCHYMATOUS KERATITIS IN CONGENITAL SYPHILIS.

ALFRED F. LUHR, M.D.

BUFFALO, N. Y.

In searching the literature for recorded cases of oculomotor paralysis combined with parenchymatous keratitis due to congenital syphilis, there are three to be found:

CASE 1. In 1907 in the Hirschberg Clinic, a child, aged 3, was seen with imperfect motion of both eyes toward the right. Also corneal opacities remaining from an inflammation during the first month of life. At that time he had inunction treatment. In 1910 a right sided abducens and facial paralysis developed. Wassermann of the boy was negative, but of the mother positive. Two years later the abducens and facial paresis were still present. Igersheimer[1].

CASE 2. In 1910, child one year of age. Right sided abducens paralysis. At the same time had an eczematous condition of the skin for eight days. Was unable to open the right eye as well as the left. In 1913, the palpebral apertures of both eyes were of about the same width; but still abducens paralysis present in the right eye. Wassermann was four plus. Shortly after, the same eye (O.D.) developed a parenchymatous keratitis. Igersheimer[2].

CASE. 3. Girl, 8 years of age. Parents were syphilitic. At the age of 3, inflammation with cloudy condition of the right eye appeared, followed in two weeks by involvement of the left eye. Both eyes remained inflamed for two years (report of keratitis at London Ophthalmic Hospital) at which time both upper lids became completely paralyzed; following this a little later was a turning toward the nasal side of the right eye and deafness of right ear. Mackenzie[3].

CASE 4. This patient was seen by Derby[4], of Boston, on June 14, 1905. Child four years of age. Diagnosis: Paralysis of 3rd nerve and parenchymatous keratitis, due to hereditary syphilis. When 6 months of age right pupil dilated. At 13 months lid drooped which lasted for two or three months. Pupil always enlarged. Occasional ptosis since then. Some corneal opacities, which became worse about eight months later. In March 1908, parenchymatous keratitis developed in the left eye, the process extending over the entire cornea. In June of the same year, the patient was practically over the attack in the left eye. Right eyelid drooped slightly, pupil of medium size. Central corneal scar.

CASE 5. To these four cases I wish to add a fifth. A boy, 6 years of age was brought to me in Dec. 1922. The left eye had been red for one week. The cornea was clouded, the infiltration being more dense over the pupillary area. Hutchinson teeth present. Some impediment in gait, the patient dragging the left leg. He was referred to the family physician and placed under specific treatment.

One month later, an oculomotor paralysis developed on the same side, the eye diverging with a slight drooping of the upper lid.

March 1923, paralysis very much improved, the gait not so marked and the cornea gradually clearing.

July 27, 1923. Returned with a parenchymatous keratitis of the right eye, but not as severe as the left. At this time the cornea of the left eye, paralysis and gait had entirely cleared up.

February 15, 1924, no recurrences, vision 20/30 in each eye. General condition greatly improved.

My thanks and appreciation are extended to Dr. E. E. Blaauw for his kind assistance in looking up the literature on this subject.

REFERENCES.

1. Igersheimer, Archives of Opthal., v. 76, p. 127, 1910.
2. Igersheimer, Archives of Ophthal., v. 76, p. 127, 1910.
3. Mackenzie, N. Y. Med. Jour., p. 605, 1884.
4. Derby, Personal Communication.

OPHTHALMOPLEGIA IN LUETIC BASILAR MENINGITIS.

DR. A. H. PEMBER.

Senior Ophthalmic Resident, Cook Co. Hospital.

CHICAGO, ILLINOIS.

This is the report of a case seen on the service Dr. G. F. Suker, at the Cook County Hospital in which there was luetic neuritis along with gummatous meningitis. There was gradual improvement under medication. Read before the Chicago Ophthalmological Society, Nov. 19, 1923. See page 297.

E. F., age 35, an American, tailor by occupation, entered Cook Couny Hospital October 29, 1923, on the service of Dr. Geo. F. Suker, with the following complaints:

Inability to move left eye—one month's duration; inability to keep left eye open—one week's duration; double vision—one month's duration; half sight to left, in left eye—one month's duration. In April, 1922, his left eye began to itch. A diagnosis of "stye" was made and on this he was treated for same. A negative Blood Wassermann was obtained at this time. He was given pot. iodid, which he took for six weeks, when he noticed he could not move his right eye. He continued the medicine and the condition in right eye cleared up in three and one-half months.

In April, 1923 (one year later) he experienced the same symptoms in his left eye. At this time, a positive Wassermann was obtained by his family physician, and he received nine salvarsan injections. He was given pot. iodid in July, and mercury rubs in August, when he noticed vision in both eyes was becoming poor. Two months later, he noticed he could not move his left eye, and that he had double vision. At the same time, he was unable to see things to his left with the left eye. One week ago, he noticed a "dropping" of his left upper lid, and that he could not hold his lids open. This has gradually become worse.

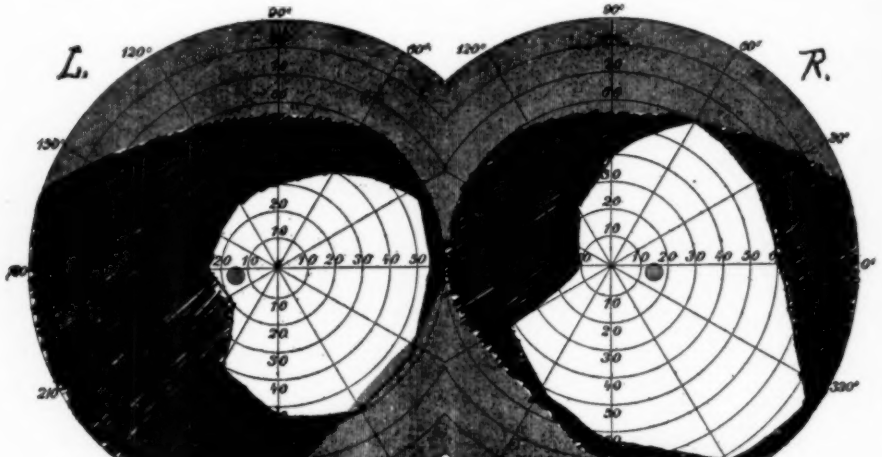


Fig. 1.—Fields of vision in luetic basilar meningitis (Pember's case) Oct. 29.

The patient gave a history of gonorrhea many years ago with apparent cure, also a soft chancre (?) eight years ago. No history of secondaries obtainable. Entire physical examination is negative except for scar on remains of prepuce, and the ophthalmoplegia.

Left eye V.=20/200; both eyes color blind. There is ptosis of left eyelid. Conjunctiva shows evidence of chronic inflammation, cornea and sclera negative. Pupil reacts to sympathetic stimulation. Eyeground shows a moderate degree of optic atrophy, with peripheral luetic chorioretinitis. There is a complete pare-

sis of all the muscles, except the superior oblique.

Right eye V.=20/200. Muscles function in all primary positions. Pupil regular, does not react except to sympathetic stimulation. No ptosis. Conjunctiva, sclera and cornea negative. Tension normal. Fundus like the left.

Laboratory examination: blood Wassermann—; spinal Wassermann+; Pandy+; Ross Jones+; Nonne+. Spinal fluid clear and not under increased tension, 580 cells per cu. mil. Mononuclear leucocytes perdominate. Urine negative.

The optic atrophy in each eye no doubt was due to a luetic retrobulbar neuritis, and the apparent homonymous hemianopsia due to an active luetic neuritis, as the latter seemingly receded, when a perineuritis, interstitial in character, developed (see Fig. 1 and Fig. 2).

The ophthalmoplegia, tho not entirely complete in each eye, at their respective time of involvement was due to a basilar meningitis of the gummatous type, which frequently causes symmetric lesions, not necessarily at one and the same time.

The ophthalmoplegia is gradually receding under medication, while the optic atrophy (descending type) is slowly progressing in spite of medication.

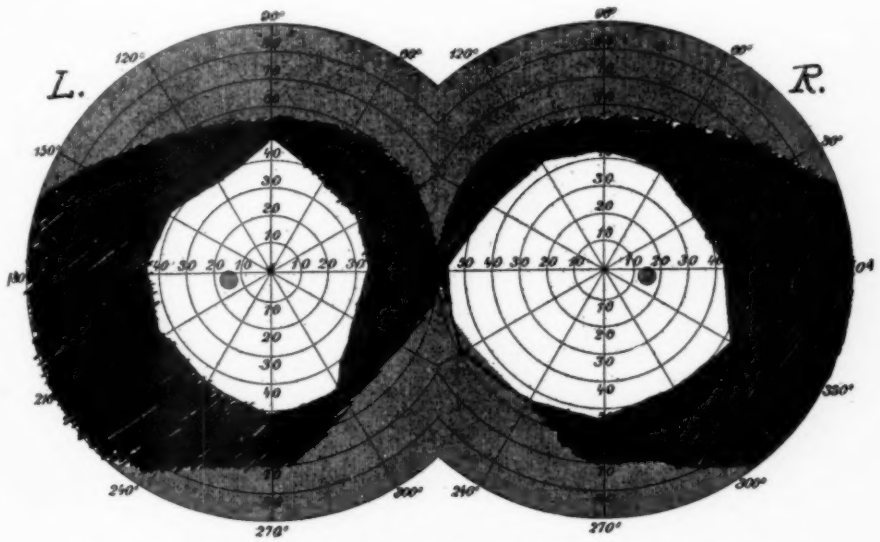


Fig. 2.—Fields of vision in luetic basilar meningitis (Pember's case) Nov. 19.

The unequal, irregular and partially static pupils bespeak a general paresis, while the ophthalmoplegia and optic atrophy are but an acute luetic exacerbation (gummatous in character?).

It is an open question whether the color blindness is congenital or of luetic origin, tho our opinion inclines to the former view.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly scientific papers and discussions, include date of the meeting and should be signed by the Reporter or Secretary. Complete papers should not be included in such reports; but should be promptly sent to the Editor, as read before the Society.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

November 19, 1923.

Dr. Robert von der Heydt, President.

Chronic Angiospasm of Palpebral Artery.

Dr. George F. Suker presented a young lady who, ever since she could remember, had a "linear" twitching of the right lower lid. She is unconscious of it, and upon close examination one finds a spasm of the inferior palpebral artery there localized, about 3 cm. in length. He had tried everything to check it, but had not succeeded. The only thing he thought would answer is ligation or excision of the vessel. However, the lesion is such a minor one that this is not worth while. The case is of interest on account of its extreme rarity. He had made a diagnosis of chronic angiospasm. What the etiology is he is unable to ascertain. Patient is healthy. Her personal and family histories are good. She is not neurotic or hysteric. She is blemish free, and he exhibited her to show anatomic rarity.

Lipemia Retinalis.

Dr. I. J. Muskat read a paper on this subject published in full, p. 288.

Discussion.—Dr. George F. Suker said that the discoverey of lipemia retinalis was always accidental. There was no case on record in which vision, aside from the usual diabetic fundus lesions that might arise, had been reduced. Vision was generally normal. Whether it is true fat, or allied to the lipoids remained to be seen. The lipemia lasted but a few weeks, when the entire retina returned to its normal appearance. During the vessel changes, the adjacent retina was not implicated. No vessel pulsations were seen during the attacks of lipemia.

The prognosis had been considered extremely serious, much more so than the characteristic change of socalled diabetic retinitis. That this condition did not more frequently occur was rather strange. This was the first case of lipemia retinalis the speaker had discovered in his service at Cook County Hospital, tho diabetic cases were quite numerous. According to the literature, one got similar cases with alcoholism and certain types of malnutrition, even in scurvy, but whether there was a true relationship he did not know. One peculiarity of this lipemia was that the substance did not give the characteristic stain with osmic acid.

Dr. Harry S. Gradle asked Dr. Muskat whether he had paid any attention to the tension of the eyeball in this condition, as in some forms of diabetes it was very important. Hertel, in 1912, in speaking of diabetic coma, described the eyeball as soft and mushy, so soft that tension could not be recorded. Such a hypotonicity occurred only in diabetic coma, but it was not necessarily an accompaniment of it, and it would be interesting to know whether there was any variation in the tension of the eyeball during the time the lipemia was observed.

Dr. Charles G. Darling stated that some ten years ago he reported a case similar to the one narrated. At that time there had been only 8 cases reported, with only one previous American case. The tonometer had just come out then, and they were interested in taking the tension of the eye. The man lived six weeks after the condition was discovered, and the tension remained normal all the time. In this case the patient's retina remained the same under dietary treatment. He did not know the history of the subsequent cases reported, but up to that time one case was reported in London in which the patient had this condition for four weeks and it cleared up. He did not have diabetes. He had 8 per cent of fat in the blood. The vessels, as a rule, looked pink where they curved up from the disc and became whiter toward the termination of the vessel. The less blood there was in the vessel, and

the smaller the vessel, the whiter it was. In the case reported to-night, when first seen, the blood vessels were much whiter than in the illustration from the article that came out in September in the Johns Hopkins Bulletin. These vessels rapidly became more normal in color. Most of the patients who had this condition had been young individuals. Very few had lipemic retinitis after the age of forty.

DR. SUKER said he did not know whether Dr. Muskat took the tension or not, but he took it with the finger and found it was normal. At the Cook County Hospital the tension of the eyeball was taken in the majority of cases with coma.

Ophthalmoplegia in Luetic Basilar Meningitis.

DR. A. H. PEMBER reported the case published in full p. 294; and said there were three similar cases admitted to Cook County Hospital in one week:

Discussion.—DR. GEORGE F. SUKER said that the point of interest was the homonymous hemianopsia in addition to ophthalmoplegia externa, combined with a pseudo Argyll Robertson pupil. He said it must be a dual lesion, one central and the other peripheral, to give the patient homonymous hemianopsia, which was improving to a certain extent, and the ophthalmoplegia externa. The chances were that the homonymous hemianopsia was due to a luetic process of optic atrophy, and the ophthalmoplegia was due to a nuclear paralysis—not a complete ophthalmoplegia externa and interna, because the superior oblique was somewhat active.

He believed syphilis was the primary cause of the optic atrophy, because one could see an incipient inflammatory condition of the disc edges. The spirochete had been isolated in several instances along the nerve tract, showing that the optic atrophy was not an ascending but a descending process. This held true from a clinical standpoint very remarkably in this man. The important thing was the homonymous hemianopsia which was synchronous in the two eyes; he had previously the same condition in his right eye that he now had in the left. In beginning tabes, even in paresis, the incipient atrophy might manifest itself a partial hemianopsia, usually in the upper outer temporal field, long before the general symptoms. As to the prognosis or final outcome in this case, he predicted that it would lead to a paretic dementia.

DR. JACOB LIFSCHUTZ wondered if this case could not be explained on the ground that the lesion was in the visual area on one side in the brain, and also in the nuclei of the muscles on the left side. He did not see why this could not be the case where one had two lesions, one peripheral, and one nuclear. Possibly the brain itself was involved, or the nuclei of the muscles in the visual area.

DR. SUKER maintained duality of the lesions because there is homonymous hemianopsia, which developed in the right eye and then in the left. If it were a central lesion, the patient would have had a symmetric hemianopsia in the two eyes. The mere fact that it was improving was an important point, because central occipital lobe lesions giving homonymous hemianopsia on a syphilitic basis very seldom markedly improved. It was only the peripheral lesion in syphilis which had a tendency to recuperate rapidly. Central lesions were longer in recovering, if ever, to complete restoration. He did not think this individual would recover, and what was more, in a central lesion there were no manifestations in such a short time of optic atrophy at the periphery; therefore, the lesion was between the eye and the chiasm, and not back in the primary centers or in cuneus lobe. If it were in the latter it would be symmetric.

Severe Burn of Upper Lid.

DR. ROBERT VON DER HEYDT showed a young man, whom he presented to the Society eleven and a half years ago. At that time the patient was injured by severe burns of the body, face and eyes. He was carrying a pail of nitric acid in the composing room of a newspaper, and fell into the nitric acid, and he sustained, besides other burns, a severe burn of the upper lid, which resulted in an ectropion, to the extent that the brow and lid hairs were bound together. There was palpebral conjunctiva which showed to the extent of a dime. He put in a Wolfe graft, and six weeks later he showed the pa-

tient to the Society. He now exhibited the case to show the perfect result obtained.

DR. SUKER congratulated Dr. Von der Heydt on the excellent result he had obtained in this case. The reason he obtained such a result was that he did not use a genuine thick Wolfe graft, but a modified Wolfe graft a la Thiersch. A thick graft, which takes in the corium, is apt to shrink and give trouble. A graft taken from the upper layers of the skin will do very nicely, and give a result such as Dr. Von der Heydt obtained in his case.

Operation for Senile Cataract.

DR. HARRY W. WOODRUFF, Joliet, Illinois, presented a patient who was admitted to the Infirmary May 24, 1921, at the age of 43, with senile cataracts in both eyes. Vision in the right eye was 20/50, and in the left eye, with the cataract almost mature, 10/200. Colonel Smith operated his left eye by the intracapsular method. There were no complications according to the record. Dr. Fisher saw this case with the other cases operated by Colonel Smith. At the time he left the Infirmary, the record showed his vision to have been 20/50. Dr. Fisher had him tested and found his vision was 20/20. His vision now in the eye operated on is 20/20 with +12.

Patient presented himself again in September last for operation on his right eye. This operation was performed October 1st of this year. The capsulotomy method was used, and simple extraction was performed with a sliding conjunctival flap; eserin was used, and recovery was uneventful. A needling operation was performed November 12. His vision in the right eye with +11, with cylinder, is 20/15.

The particular point to emphasize in showing this case is that one eye was operated on by the most distinguished cataract operator in the world. The visual result was normal. Attention is called to the fact that the patient is a comparatively young man, 43 years of age, at the time of the first operation. Authorities including Colonel Smith himself call attention to the respective ages at which the intracapsular operation is most apt to be successful.

Many ophthalmologists have examined this case, mostly with magnification and illumination, and have seen in the drawn up pupil the presence of a membrane extending from the lower border of the pupil to the corneal wound, with adhesions of the iris to this membrane, pigment showing, and also adhesions of the iris to the corneal wound. Notwithstanding this membrane which partially fills the pupil, particularly the central portion of the pupil, he has remarkably good vision, and it is due to the fact that there are clear spaces on the margins of the membrane.

A point to be emphasized is, that one should not allow his enthusiasm for certain particular methods of operating to cloud his judgment. Of course, Colonel Smith was in this country for the purpose of demonstrating a particular operation, and it is not with the idea of criticizing Colonel Smith as an operator, but to call the attention of the Society to the point that there are certain restrictions. The speaker believes that men of the age of this patient or younger, with cataracts coming under the classification of senile, should not be operated by the intracapsular method.

In this particular individual, the opportunity afforded itself of showing the results with the two methods of extraction. The visual results are practically the same so far as testing with the test types show, but the visual results must be better in an eye with a physiologic pupil than in one that is immobile and has a large coloboma in the iris. He also emphasized the fact that one can with almost certain safety perform a simple extraction without the danger of prolapse of the iris, which is the bugbear in simple extraction, if one use the sliding conjunctival flap, sometimes called the "Van Lint flap," bringing down a flap of conjunctiva and placing the sutures at an angle; so when the flap is drawn down over the cornea it is on somewhat of a tension, acting as a splint, thereby holding the corneal flap well down. The ordinary conjunctival flap is not very much of a protection against prolapse of the iris, if any, but the sliding conjunctival flap is a very positive and definite protection.

Discussion.—Dr. William A. Fisher, in referring to the case operated by Colonel Smith and reported by Dr. Woodruff, said that he only brought the patient to the Society on a previous occasion because his vision was 20/20. This case would have been rejected by Colonel Smith if he was operating for statistics, but we all knew he did not reject any. This case was not one for an amateur to remove the lens in capsule. The amateur should select patients sixty years of age, or over, because the zonule is hard to break if the subject is young. There was no objection to an expert operating at 43, and there was no objection to removing lenses and leaving a round pupil. The only reason for an iridectomy is to prevent prolapse of the iris, and this can be prevented, or the percentage reduced, by a small peripheral iridectomy (Hess). A round pupil, such as Dr. Woodruff presented, was desirable if iris prolapse was not more frequent than with iridectomy.

The membrane that Dr. Woodruff spoke about in the upper edge of the wound in Colonel Smith's case was undoubtedly a burst capsule. If the capsule burst in the upright delivery it fell into the vitreous, but if the zonule broke below and the lens tumbled, and the capsule ruptured, it was found hanging in the wound and could be removed. In this case, there was a burst capsule which was removed with forceps, but a piece was left in the wound. The operation in this case by Colonel Smith, even tho the patient was only 43, was attended with a perfect result—no postoperative inflammation and vision 20/20.

Dr. Woodruff stated that altho Dr. Fisher said Colonel Smith could operate on any eye at any age by the intracapsular method, it was a question whether Colonel Smith should operate on every eye at any age. It was quite generally conceded that age does make a difference regarding the particular method that is used. He mentioned an article by Dr. Dorland Smith, of Bridgeport, Connecticut, a year ago, in which he (Dr. Smith) attempted to classify the various cataracts. Smith had made a pilgrimage to India and did the Smith-Indian operation, but he attempted to classify the various kinds of cataracts and also the various ages at which the intracapsular operation was better performed or better not performed. He believed in the last analysis of this subject, it would be shown that it would be more nearly the correct opinion to operate on eyes at different ages by different methods, as the lens capsule was thicker and more firm at certain ages, as well as the suspensory ligament; and it was not reasonable to suppose that one particular operation should be the procedure for any age.

Lymphosarcoma of Lid.

Dr. Jacob Lifschutz presented a man, 40 years of age, first seen on October 19, 1923. Patient stated that he had never had any previous eye trouble until four months before he came to the clinic, at which time he noticed a growth on the inside of the left upper lid, causing drooping of the lid and irritation of the eyeball. No history of disease of the eye could be obtained, nor of irritation, trauma, or growth. His blood Wassermann was negative.

Examination of the eye showed the reflexes, motility and tension normal. There was nothing in the interior of the eye. His vision is 20/40 in the right eye and 20/20 in the left. Examination revealed a tumor quite vascular and very well defined extending along the horizontal meridian of the upper lid, beginning from the lower margin of the tarsus, but not including it, all the way down to the retrotarsal fold. The tumor is very hard and of the consistency of cartilage. He took out a vertical piece for section. There is no infiltration anywhere beyond this region; there are no palpable glands, and altogether there are no symptoms which would indicate malignancy. Examination of a slide by Dr. Lane showed no tissue on which one could make a diagnosis. There are several rows of epithelium which have undergone mucoid degeneration. There are some newly formed vessels, plasma cells, and a great deal of infiltration of round cells. The probable diagnosis lies between a granulation tissue tumor, due to a reaction to chronic irritation, and lymphosarcoma. The specimens do not show anything definite. One might have to remove the tumor and section to find out what the growth really is.

Discussion.—Dr. Harry S. Gradle asked Dr. Lifschutz if, in examining these specimens, he considered the possibility of circumscribed conjunctivitis hypertrophica intracellularis, which was described some years ago by Paescheff. This is usually not circumscribed, but a diffuse condition involving the entire conjunctiva.

Dr. Lifschutz said he had made a preliminary report. Sections were removed and stained, and he proposed to present the case later with slides. The only way to make an accurate diagnosis was to make a microscopic examination. So far the sections did not show anything. He took a vertical section from the tumor mass.

Dr. Von der Heydt asked whether there was anything connected with the case which made Dr. Lifschutz think of sarcoma.

Dr. Lifschutz replied, that what made him think of sarcoma was the rapidity of the growth, and the great number of mononuclear leucocytes. He had never seen a case like this. In view of the fact that the man received no injury and the tumor started to grow and spontaneously attained its present size, the probability was it might be a malignant growth. He did not know whether it was a wise thing or not to remove a section. It might have been a mistake, and yet this section was negative.

Dr. Von der Heydt said that a sarcoma of this size might produce a mild Wassermann reaction.

Dr. Lifschutz asked the members as to the advisability of removing sections of such cases for examination.

Dr. Suker replied that from a general surgical standpoint it was not advisable to make sections for staining unless one had a frozen section and determined it then and there. This was Billroth's general surgical principle and it held true today. Any tumor one wanted to examine should be examined by the frozen method, and one should decide to remove a part of it, if not remove it entirely, and then make a section. That was the better plan.

Tumor of the Upper Lid.

Dr. Charles F. Burkhardt, Effingham, Illinois, reported the case of a patient with a tumor, that he saw a year ago. The reason for reporting the tumor was because of its rarity. The man complained of something which he said was like a scum over one eye. He kept rubbing his eye, but the scum would come back. The speaker everted the upper lid thinking there might be something under the lid creating irritation. He found under the upper lid a small tumor mass, about five millimeters in diameter, lying closely in contact with the conjunctiva of the lid. He everted the periphery of the disc shaped mass, which was attached at the center to the lid by a pedicle one millimeter in thickness. He noticed it was very movable, and the lower surface of the tumor was concave in conformity to the eyeball on account of the lid action. Assuming that there was perhaps a small pedicle attaching the tumor to the lid proper, he dropped a little cocain into the eye, and then with a very small snare wire, snared the growth off, and the pedicle was not more than a millimeter in diameter. Recovery was uneventful.

Discussion.—Dr. Hiram J. Smith said he had not seen a tumor like the one reported by Dr. Burkhardt, but recently he saw a growth of the conjunctiva following an operation, which resembled in external appearance and on microscopic examination the tumor mentioned. This tumor was pedunculated and came from a stitch. It was about the size of a shoe button when removed, and how much larger it would have grown he did not know. Microscopic examination showed it to be a granuloma.

Intra-or Extraocular Foreign Body?

Dr. William A. Fisher reported the following case and presented the patient, because the subject of a paper was magnet operations: H. Morgan, aged 18, was injured September 16, 1923 by striking a piece of metal with a hammer. He saw the patient one week later, and found the lens partially opaque, quite the same as at this time, and vision 4/200. The eye looked as tho a foreign body might have penetrated it, and an X-ray was made by Wheeler, Sinclair, Cotchy and Wiese with a negative result. They applied the giant magnet after getting the negative X-ray report, but this was also negative.

Another X-ray was made a few days later for the insurance company (by

Potter). This X-ray located the foreign body in the eyeball. They came to him again with this information, and in consultation with Dr. Faith, another X-ray was made by Hubeny and the foreign body located outside of the sclera. The magnet was again used but with a negative result. Then an effort was made to remove the foreign body thru the conjunctiva at the temporal side, which would have been a very difficult feat to perform, but would have been very satisfactory to the patient if the foreign body had been removed. The eye is now quiet, and the pupil is active; there are no adhesions of the iris, same opacity as at first examination and vision is 4/200. The only evidence of injury he has is the opacity of the lens and the redness of the conjunctiva at the temporal side, where an effort was made to remove the foreign body.

He is 18 years old and the lens may become absorbed. It is now two months since the injury, and no trouble need be expected from infection, and if the foreign body was outside of the eyeball, as he fully believed it was, no trouble need be expected from it. While X-ray pictures were very valuable and appreciated, this case proved that one could not always rely upon an X-ray picture even tho made by experts as in this case. The only question regarding this case was whether or not an opening should be made in the eyeball, and an attempt made to remove the foreign body, which one expert believed to be in the eyeball and another outside of it. He did not consider this justifiable.

Discussion.—Dr. Thomas Faith said he saw the case reported by Dr. Fisher, and the important question arose whether an attempt should be made to search for the foreign body thru an opening in the sclera. One X-ray picture was negative, while another localized the foreign body just inside the sclera, and a third one just outside the sclera. At the present time he thought there was no justification in opening the sclera for the removal of the foreign body, as it was not known whether it was in the eye or not. Personally he tried to locate the foreign body outside of the eye without success. One should remember in this connection that some of these pieces of steel were so situated that it was impossible for them to attract the magnet, even tho one might feel that the foreign body was inside the eye.

Dr. Woodruff asked Dr. Fisher if he had accurate localization charts presented to him by the X-ray operators. One of the most satisfactory cases he had had to deal with was one where the foreign body in the eye had been localized by a man who knew how to localize it, and who furnished one with a chart, and it was very rarely that the foreign body did not lie exactly where the chart indicated. He referred to the work of Dr. H. P. Wells who had done his X-ray work. It seemed to him that if a young man had the power to focus his other eye and to hold it perfectly quiet, so that two pictures could be taken without any movement of the eye, and the correct mathematical computation made, it was about as accurate a proposition as one could have.

Dr. G. Henry Mundt agreed with Dr. Woodruff, that localization of foreign bodies was a very valuable adjunct to removal of foreign bodies, and said that it had been a satisfactory method to him for the location of foreign bodies in the globe or orbit. He thought in some cases the easiest method was the use of the scissor extension of the magnet. He used this method for the first time about a year and a half ago, in the case of a foreign body that penetrated the globe. It was quite large, and he had considerable difficulty in getting the foreign body out, until he went down on it with scissors and by scissors extension removed it. He believed this was an admirable method of removing a foreign body when it was in the orbit. He read this two years ago in an article by Dr. Edward Jackson.

Dr. Darling said it was a question whether a foreign body in the orbit should be left there, or cut down on with scissors and removed if it had gone thru the eye. In penetrating foreign bodies that went thru the sclera into the orbit (unless the lens was greatly swollen, setting up an iritis), the eye quieted down quickly and usually caused little subsequent trouble.

Dr. Fisher, in closing and replying to Dr. Woodruff, said he had had X-ray

pictures by Drs. Potter and Hubeny, one picture showing the foreign body inside the sclera, and the other showing it outside. He did not question the work of either one of these gentlemen because they were expert, but one of them must be wrong.

Dr. Mundt suggested a method of removing a foreign body when outside of the sclera, which might have succeeded in this case. Dr. Darling suggested that foreign bodies outside of the sclera clear up rapidly. This eye was clear now, except where one attempt was made to remove the foreign body from under the conjunctiva.

There was no question of a foreign body being present in the eye or on the outside of it, but he was having trouble, and his vision is 4/200. When a foreign body has passed thru the lens, it was far safer to dilate the pupil and remove the foreign body thru the anterior chamber. No matter where the foreign body was localized, he would not think of going back of the lens to remove it.

Iridocyclitis and Neuroretinitis with Ethmoiditis.

Dr. T. D. Allen presented the case of a boy, 16 years of age, who just before leaving England for the United States in August, 1922, became ill with an intestinal condition. On coming to Chicago, he was placed in the Presbyterian Hospital for observation and treatment.

The condition was essentially an ulcerative colitis, associated with marked fermentation, and with superficial erosions of the mucosa of the rectum and probably of other parts of the bowel. He passed large amounts of blood and pus; and had an accompanying daily rise of temperature to 100-102°. He had had for many years a nasal discharge. Part of his treatment consisted in irrigation of the left antrum which had been found cloudy.

A year later he was again taken to the hospital because of a recurrence. After he had been there for several weeks, during which time the left antrum was again irrigated, he developed an acute conjunctivitis and an eye wash was ordered. Three days later the tonsils were removed. Seven days after this was done, the eye became painful and photophobia developed; he was seen the following day. At that time no ciliary tenderness but ciliary injection was present, and the left iris was slightly discolored. Hot applications, a sweat, atropin and an eye shade were ordered. Salicylates were not ordered because of fear of upsetting the bowel. Five days later they were started, 15 gr. t.i.d. Five days after the onset of the iritis, as the patient became steadily worse, posterior synechiae and precipitates on the back of the cornea of the left eye having formed, and the condition beginning in the right eye, Dr. William H. Wilder saw him, confirmed the diagnosis of iridocyclitis, and suggested 5 per cent dionin and foreign protein.

Thru fear of upsetting the bowels, the foreign protein was not insisted upon and not used until the ninth day after the onset of the iritis. At that time the patient had a violent blepharospasm, so that the slightest light caused intense pain in the left eye and nearly as severe in the right. Consequently no fundus examination could be made, but it was ascertained that the pupils were not satisfactorily dilated and that there was moderate conjunctival edema. Again Dr. Wilder urged foreign protein.

A small dose of killed typhoid bacilli was given intravenously (about 20,000,000) on July 22. The chill was severe, and the temperature was 102°. The ocular reaction was gratifying; the photophobia and blepharospasm were markedly reduced, as were the ciliary injection and conjunctival edema. The bowel condition also improved in a very gratifying and unexpected manner.

Four days later a second dose (about double the first) was given. This time the temperature went to 102.6°. The condition of the eyes improved, so that it now became possible to use the ophthalmoscope. The right pupil was fairly well dilated; there were deposits on the back of the cornea and on the capsule of the lens; the vitreous seemed clear and the fundus normal. The left pupil was irregularly dilated, several posterior synechiae having formed; there were numerous deposits on the back of the cornea and front of the lens, so that details of the vitreous and fundus could not be obtained.

Two more doses of vaccine, each of about 60,000,000 bacilli, were given at 4 and 10 day intervals, with but slight chill and temperature of only 100 and 101°. The eyes gradually cleared. Unfortunately, as would appear later, no further attempt was made to view the fundi. He was discharged from the hospital September 5. On October 4th he reported at the dispensary. His vision was R. 20/50; L. 20/100. After homatropin instillation, the right pupil dilated evenly and normally but the left was irregular, being bound by several posterior synechiae, as at present. The right media seemed clear and the fundus normal, but to his surprise, in the left eye, seen thru a slight haze (probably entirely due to the exudate on the lens capsule, as no vitreous opacities were seen), the optic disc was slightly swollen, the outlines blurred, and the vessels for some little distance from the disc were slightly swollen and tortuous (not in the plane of the retina); there was no hemorrhage or gross exudate, tho the retina seemed slightly swollen.

He was immediately referred to the nose and throat department, where again a shadow was found in the region of the left antrum; the antrum was treated in the routine way, mucopus being found on irrigation. This was continued for five days, when he was discharged from the nose and throat department; but there was no change in the ocular condition; unless, possibly, the neuroretinitis had become worse. The dental report by Dr. Moorehead was that there were several cavities in the teeth but no abscesses.

He was again referred to the hospital, and the routine treatment prescribed, bed, hot applications, atropin, dark glasses, salicylates. A more thoro search was made in the nose. The nasal septum was straightened by Dr. Edwin McGinnis, and when this had been done, mucus was found coming from the region of the left ethmoid cells. The turbinate was fractured and the left ethmoid cells opened up widely. For the following few days there did not seem to be any change in the fundus, but shortly thereafter the swelling began to subside. He was discharged November 12. His vision now (November 19) was R. 20/50; L. 20/70. The swelling of the retina was still discernible, but was very much reduced. The form field was practically normal; also field for red. The green field was not taken. The blind spots were both enlarged, the right one and a half times normal, the left about three times normal. No other scotomas were found.

If we accept the theory that ulcerative colitis was an infectious condition, essentially secondary to some other focus in the body (as is arthritis and iridocyclitis), then we had reason to assume for purpose of discussion that this picture was a unity—a single problem whose solution would naturally lie in the discovery and removal of the primary focus. The antrum of Highmore often acted as a reservoir for the secretions of several nearby accessory sinuses. In this particular case, repeated drainage and treatment of the antrum failed to affect the colitis; and soon after such treatment, while still in the hospital, the iridycyclitis developed. This would lead him to believe that the condition of the antrum had slight, if any, direct causative influence, and that probably the ethmoiditis had existed for many months.

If the improvement was permanent, it might be assumed that the ethmoiditis was the cause, if not of the origin, at least of the continuance of the pathologic picture. As the foreign protein injection was followed immediately by a rather remarkable reduction in symptoms, both of the intestinal and ocular conditions, it might have led him to abandon the hunt for the primary focus, had not the neuroretinitis been found. Whether the neuroretinitis existed at the time of the uveitis could not be stated definitely. He was inclined to think it did. The tonsillectomy was done a few days before the iridocyclitis developed. He had been told that cures following immediately after tonsillectomy were due to either removal of a focus, or to absorption of certain elements at the site of the wound, which acted as a foreign protein. In this instance neither was the removal followed by improvement of the colitis, nor was there a general reaction similar to that following the foreign protein given a few days later. Foreign

protein treatment had a definite place in our armamentarium; but it should not cause us to relax one whit in our scientific endeavors to locate and eradicate the cause of a lesion.

Deductions from 120 Intraocular Steel Operations.

Dr. Sydney Walker, Jr., said that the symptoms complained of varied in the extreme, from slight discomfort to severe pain. Subjectively, if the lens was uninjured, the complaint was slight, and in many cases there was none. But if complications had developed, such as slight hemorrhage into the vitreous, faint lens opacities, the symptoms were naturally more leading. To him the faintest trace of floaters in an eye which had been injured usually suggested a tentative diagnosis of intraocular steel.

The diagnosis was not always easy. Direct inspection some hours after the accident might fail to disclose any perforating wound, and the reaction present was often slight. In these cases the slit lamp and corneal microscope might disclose a faint perforation of the cornea, or of the lens. Further, small sharp particles at high speed often riccocheted in a peculiar manner, and lodged posterior to the globe without perforating.

The complications which might develop were many and were a large factor in the ultimate outcome. Corneal scars were usually of little consequence; tears of the iris likewise. When the lens was injured we had a serious problem to meet. It was true that the resulting cataract could be extracted, but in the State of Illinois the aphakic eye in the hands of the Industrial Commission was looked upon as industrial blindness. A correcting lens according to the Supreme Court was held the same as a crutch. For this reason many of these cases were left with the cataract unoperated.

Enucleation was indicated in approximately 25 per cent. of all such cases. Industrial patients were handled differently from the average private case. When an eye was blind, inflamed, or should necessarily go thru a long siege of inflammation, or when the wound was of large extent and involved the ciliary body, it was to the best interest of all concerned to enucleate. The reasons why such a course was followed were: that the patient was put back in his former earning capicity in a relatively short time, his appearance was better with a false eye than with a shrunken painful dangerous mass, and naturally the expense of a long drawn out temporary disability was less.

What was the future of the eye which had had intraocular steel removed? This depended to a great degree upon the site of the wound, and the complications which followed. As a general average, he could safely state that about 40 per cent. ended with useful to good vision. His cases extended only over a period of four years, approximately 30 each year, and he felt that time would tell the outcome in some eyes which he now claimed as good results.

The ease of removal of the steel depended to some degree upon the length of time elapsing since the injury. Further, in these cases the technic used was of some importance. He had used the Hirschberg hand magnet to the exclusion of all others, and had yet to fail where the foreign body was magnetic. In those cases in which the steel was in the vitreous, and they were the most difficult, he turned back a conjunctival flap over that portion of the ora serrata nearest the foreign body, incised the sclera in the long axis enough to admit the magnet point, entered to within 2 or 3 mm. of the steel, switched the current on and off several times in that position. Should this fail, which was not often the case, entrance was again made, attempting to nearly reach the body with the magnet tip, and the steel removed.

Discussion. Dr. Hiram J. Smith said that detachment of the retina was the most serious complication he had had to deal with in these cases. Pathologic complications were frequent, especially hemorrhage into the vitreous and later organized exudate, which by its contraction was a frequent cause of detachment. A case now under observation had detachment from this cause a little over one year after the penetrating wound. Patient had had normal vision during the interval with glasses. Dr. Walker was right in saying that the ultimate disability could not be determined until a year or eighteen months later.

During 1921, 41 cases of penetrating wounds of the eyeball were seen. Nineteen cases had a foreign body present within the globe. Complications were as follows: Traumatic cataract 19; chronic iridocyclitis 4; hemorrhage into vitreous 6; secondary glaucoma 3; detachment of retina 3; retinitis proliferans 1; panophthalmitis 1; infection does not occur as often as might be expected.

One case in which traumatic cataract occurred was worthy of further mention. At the time of injury, no defect of cornea and no evidence of any intraocular injury was found on repeated examination under a mydriatic. Vision was 20/16. The patient complained of seeing specks and geometric figures before this eye. X-ray indicated a foreign body of one millimeter dimension outside the bulb. About six months later, a stellate, postcortical, lenticular opacity, centrally located, began to be visible, also siderosis. A second X-ray showed a foreign body in the vitreous, just back of the ciliary body, below, in the vertical meridian. This was removed with the magnet thru scleral incision without accident. The eye remained quiet, but cataract progressed gradualy to complete opacity with corresponding failure of vision. What was the pathogenesis of the cataract in this case, and why did it occur so long after injury? What part did the intraocular foreign body play in the production of the cataract?

Referring to Dr. Fisher's statement about the use of Haab magnet, he had never succeeded with it in cases where the Sweet hand magnet had failed. He was partial to the posterior route for removal of foreign bodies in the vitreous. He did not feel that Dr. Woodruff's experience was unusual. He had found X-ray localization checked up quite accurately, and the foreign body was located with magnet, within two or three millimeters of localization shown by X-rays.

Dr. William A. Fisher. Twenty or more years ago, he imported the first Haab magnet and read a paper before the Society in which he reported 150 cases, which were published in the *Ophthalmic Record*. He spoke of this because the results at that time seemed to be about the same as he was getting now. The results then were good vision in 96 cases, that is, where vision could be improved and made good with glasses. When Dr. Walker spoke about the mattress suture or the conjunctival flap, he recalled that last year he saw Professor Barraquer in his clinic at Barcelona insert a conjunctival stitch in all of his cataract operations, but he tied the suture with two pairs of forceps. Tying a thread in the eye with the fingers was unpardonable as long as one could use two pairs of forceps so readily and not invite infection.

Clarence Loeb,
Corresponding Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Section on Ophthalmology.

November 15, 1923.

Dr. McCluney Radcliffe, Chairman.

History of the Section.

Dr. de Schweinitz made a brief address on the history and activities of the Society, afterwards the Section, of Ophthalmology of the College of Physicians of Philadelphia. The Society was organized November 18, 1890. The Section was established on November 18, 1893, with Dr. William F. Norris, Chairman, Dr. Edward Jackson, Clerk.

The Charter Members were Drs. Thomas H. Fenton, H. Earnest Goodman, Howard F. Hansell, George C. Harlan, Francis M. Perkins, B. Alexander Randall, S. D. Risley, John B. Roberts, Edward Jackson, William F. Norris, Charles A. Oliver, G. E. de Schweinitz, Charles Schaffner, William Thomson, Charles H. Thomas.

Monthly meetings, the summer months excepted, have taken place since these dates. During the past thirty-three years, papers relating to practically all the departments of ophthalmology have been presented, a few communications on comparative ophthalmology have been made, and considerable attention has been paid to ophthalmoneurology.

Extraneous Factors Bearing Upon Refraction.

Dr. William Campbell Posey read the paper published in full p. 270.

Discussion. Dr. T. B. Holloway stated that of the orbital and lid condi-

tions apt to affect the refraction, he believed chalazia were the most frequent. In his experience these lesions, like pterygium, were more prone to affect the astigmatism rather than produce such definite changes in the amount of the hyperopia or myopia. While changes due to conjunctival conditions undoubtedly cause changes in the refraction, it was most unusual in the experience of the speaker.

As Dr. Posey inferred, the cases of greatest interest were those where the ciliary muscle was affected either partially or completely. This immediately suggests those instances of toxemia following intestinal sepsis, a source which has been much emphasized and one from which the clinical leads are marked but the scientific leads are rather short. Much the same may be said about the toxemia arising from adjacent or remote infectious areas.

In at least two papers Veasey has called attention to paresis of the accommodation resulting from focal infections. In two instances Dr. Holloway had seen the same effect following a streptococcus infection; the real interesting part was not so much the clinical manifestations as how these effects were produced. Is the toxic action on muscles or nerves, or in certain instances are the blood vessels responsible. In most cases of diphtheria and syphilis the innervation is probably at fault, the same may be said about diabetes, but the muscle is not wholly eliminated. Have these toxins a selective action? Such a theory would be acceptable to some and rejected by others. Two years ago de Schweinitz quoted Flexner as saying we know little or nothing about the toxins of the pyogenic cocci. Does the element of strain or injury, not necessarily severe, enter into the question.

Changes in Refraction of Ametropic Eyes.

Dr. William Zentmayer gave the following conclusions, reached from a study of several hundred eyes, in which the interval between the first and the final test was from five to twenty years. Ametropia tends to change in degree even when the error is carefully and repeatedly corrected and the glasses worn constantly. The greatest tendency is towards an increase in the static refraction with an increase in the astigmatism, that is, in compound hyperopic astigmatism the hyperopia tends to decrease and the astigmatism to increase, often proportionately. In compound myopic astigmatism the myopia tends to increase and the astigmatism also to increase. There is no greater tendency for compound myopic astigmatism to change than there is for compound hyperopic astigmatism to change. Simple myopia (rare) almost invariably increases in amount. Simple hyperopia may remain unchanged, or undergo an increase or decrease. In mixed astigmatism both of the principal meridians may change in amount and direction. Astigmatism is often acquired in hyperopic eyes. Before the 45th year the axis of the acquired astigmatism is as frequently with as against the rule, or, to use the terms Jackson prefers, direct or inverse, but after the 45th year it is against the rule, or inverse, in 85% of the cases. The total astigmatism may be lost, probably in any period, but more commonly in the later decades, and at this time probably represents a transitional stage to astigmatism against the rule (inverse). A change in the direction of the axis of astigmatism occurs in about 50% of the cases.

In 51 of all compound hyperopic astigmatism cases showing a change in the amount of hyperopia or astigmatism, there was a decrease of the hyperopia and an increase of astigmatism. In 19 there was an increase in the hyperopia and a decrease in the astigmatism.

In patients over 45, in which the average age at which the final test was made was 58 years, in 40% there was a decrease in the hyperopia and in 33% there was an increase in the hyperopia.

In 44% of all compound myopic astigmatism cases showing a change there was an increase in the myopia and an increase in the astigmatism. In 26 there was an increase in the myopia with a decrease in the astigmatism.

Discussion. Dr. H. Maxwell Langdon said that undoubtedly myopia is retarded in progress by a properly gauged and continually worn correction, but aside from this it seems that correc-

tion served rather to lessen discomfort and improve vision than to alter the error. Changes of refraction may be divided into two groups, the first consisting of a small number of congenitally highly hyperopic and usually also highly astigmatic eyes, which are not prone to very great changes of refraction, and the second, the large mass, which may do anything. Astigmatism tends to increase as does myopia, but it is quite impossible to fortell the future in any given case.

The most surprising alterations are those minor ones which occur, apparently for no reason, in eyes with moderate error,—the shifting of an axis ten or fifteen degrees in a year or even less, and only one eye being affected. Such changes are apt to occur in individuals who are not in robust health and probably represent nutritional changes in the globe, but frequently they occur where the health is excellent. He regarded such changes as a minor cycle of alteration of refraction, whereas those which proceed steadily thru the phases which Dr. Zentmayer has described might well be considered as a major cycle of changes.

Dr. B. Alex Randall said that changes in the refraction of accurately corrected eyes have long been of great interest to us in Philadelphia, where measurements have been made under mydriatic and other precautions, which we cannot always recognize in work done elsewhere. Norris and Risley were about the first to certify such changes; although Dor of Lyons would "Recognize from the cradle as myopic the eyes which the pseudoscientist would set down as emmetropia or even hyperopia"; and Macnamarra deprecated full correction of hyperopia as impeding the change towards emmetropia, which he regarded as normal and beneficial. In my study "Can Hypermetropia be Healthfully Outgrown?" this question, as well as the contrary view as to "hypermetropia acquisita," seemed fairly answered in the negative; and Jackson, as well as myself has had occasion to note change in the astigmatism of our own eyes measured with reliable efficiency. This latter point especially interested me after I had greatly disgusted Javal by measuring with the ophthalmometer in his laboratory a much higher degree of 'astigmatism against the rule' in his cornea than he acknowledged in 1884; and then four years later seeing him with one eye already lost by glaucoma and the other only partly and temporarily saved by iridectomy. The experimental studies in Pflueger's Clinic which showed this change in the corneal curves under artificial hypertension seemed to justify the belief that the like increased curve in the horizontal meridian in human eyes is prodromal of glaucomatous pressure; just as increased curvature of the crystalline lens may mark the swelling of incipient cataract, before any striae of opacity can be recognized. The view presented by Dr. Zentmayer that such change toward 'astigmatism against the rule' is merely senile and not of ill omen is rather tranquilizing; and we must hope that wider and longer observation will confirm it.

In closing Dr. Zentmayer stated that while it could not be denied that increased intraocular tension might produce an inverse astigmatism, still when we consider that, after the 45th year this type of astigmatism is present in 85% of the cases with acquired astigmatism, and also that chronic simple glaucoma is comparatively rare, occurring in only 6 per cent, of all eye cases, it is probably a coincidence and not a result of the increased intraocular tension.

Relation of Exophoria in Early Presbyopia to Refractive Errors.

Dr. Luther C. Peter said that routine muscle studies reveal an increasing number of exophorias from the age of thirty-five to that of fifty, most of which can be included in two groups: First, the cases which begin in early adult life and are carried over to the presbyopic period with increased symptoms; and second, "accommodative exophorias" of hypermetropia, due largely to waning accommodation. The paper is concerned with the latter group. A majority of these cases have established for themselves a vicious disturbance in the relation of the meter angle of convergence to the diopter of accommodation. While convergence and accommodation are closely related, and this relation may be a factor in the development of convergent squint, Donders has clearly pointed out that each may work inde-

pendently in the interests of clear, binocular vision. Cases of hypermetropia, therefore, uncorrected until the presbyopic age begins, are apt to have exophoria for distance with an increased amount of exophoria for the near point.

Steps necessary to correct this type of exophoria are: First: Careful refraction under a cycloplegic strong enough to uncover all latent hypermetropia. In high degrees of hypermetropia, the disturbed relation of muscle balance and accommodation must be corrected gradually by having the patient work up to the full correction for constant use. A common fault of prescribing opticians, and unfortunately of careless oculists, is to prescribe at this time a full correction for reading, and allow the patient to go uncorrected for distance because they have full 6/6 vision or better.

The second step necessary is careful training with prism exercises and the use of the stereoscope. The latter instrument acts as a stabilizer in patients in whom abduction and adduction are both good, but poorly balanced. This group usually have esophoria for distance and exophoria for the near point. The technic of the exercises is of much importance if one hopes to obtain results. Each step in these exercises has been carefully stressed in the paper. The prognosis in this type of case is good if care is observed in the working out of details as outlined.

Dr. William Zentmayer stated that Dr. James Wallace early taught him that some of the most troublesome refraction cases that he would have would be in patients about the age of 35 with hyperopia, and who had never before worn glasses. In these patients in whom the accommodation had been in excess of the convergence, the correction of the hyperopia immediately put these two functions in their proper relation. The relaxation of the accommodation results in a corresponding lessened innervation to the interni with a resulting exophoria. This complication can be met in one of three ways; by giving the weakest glass consistent with the work to be done, by incorporating prisms bases in, and by adduction exercises. The last is the preferable method and often gives symptomatic relief without apparently changing the amount of exophoria.

In his experience when an exophoria develops for distance and there is a much higher degree for near (convergence insufficiency with divergence excess), prism exercise frequently fails while prisms with bases in are of assistance. The principle of relieving convergence in cases of convergence insufficiency and relieving accommodation in cases of convergence excess is applicable to the correction of ametropia at any age.

Dr. H. Maxwell Langdon said that he had seen two cases with normal vision in each eye and apparently normal muscle balance, at least their answers when tested with the Maddox rod approximated orthophoria at the reading distance, but at the near point they seemed to have a poor converging power, and attempted prism exercises showed binocular simultaneous vision was impossible, the Maddox rod test on close questioning having been seen with alternating eyes. A similar condition may be the reason that some of the other patients found it impossible to see two lights simultaneously.

Dr. B. Alex. Randall said that exophoria had grown into better recognition in the recent decade and it is now hard to believe that so few understood it in the past. Risley's study in 1880 of "Weak Eyes in the Public Schools of Philadelphia," just mentioned by Dr. de Schweinitz, was the first, and his "Eyes of Medical Students" in 1884, the second investigation in which exophoria was even sought for, and then mainly as "insufficiency" for the near. Those who made inadequate search for latent hypermetropia were then quite as much interested, like Loring, in "insufficiency of divergence." The teaching of Donders as to the range of relative accommodation and convergence is too often forgotten; and the apparent divergence of myopia and even the concomitant strabismus and hyperopia is sometimes assigned to anatomic configuration of the globe and orbit, rather than to the essential yoking together of accommodation and convergence. Yet if every uncorrected hypermetrope is not to be strabismic, he must exercise this range and generally learn to increase the negative part of his convergence and hence become potentially divergent.

Correction by glasses of hyperopia or

presbyopia tends, of course in this same direction; and I believe that Risley and I were the first thus to point to insufficient convergence as characteristic of the hypermetrope rather than of the myope as was almost universally taught. My own eyes with low hyperopia but 5° of exophoria for far and 9° for near, as measured in 1879, were painful examples of this truth; and doubtless enforced it early and strongly upon my attention, in spite of huge convergent power able to overcome almost any strength of abducent prisms. The usual name "insufficiency of the interni," was no slight obstacle to a due appreciation that the muscles themselves were probably unduly strong, yet their faulty correlation with the accommodative activity left them still the source of "muscular asthenopia." Certainly in Vienna in 1883 I found such error strongly held.

Refraction of Aphakic Eye and Spectacles.

DR. BURTON CHANCE read the paper on this subject published in full p. 268.

Results of Deep Incision of Lens for Congenital Cataract.

DR. BURTON CHANCE exhibited: (1) A girl of eight or nine years from whose two eyes he, a year or so ago, had caused the absorption of congenital cataracts, in a single operation on each by the deep incisions of both anterior and posterior capsules as advocated by Dr. Ziegler. In this case the two eyes were treated at the one seance, and the child was sent home after a few days. At no time was there the slightest reaction. The pupillary spaces became clear at the end of three or four weeks and glasses were immediately ordered. At the last testing the results were most satisfying and the child had advanced rapidly at school.

(2) A young girl of nine, who presented a broad pupillary membrane covering the anterior pole of the lens, from which thick strands radiate into the iris. In the left eye a complete cataract had been present, but it was removed by a single operation as in the first case.

Synchysis Scintillans Contrasted with Snowball Vitreous Opacities.

DR. T. B. HOLLOWAY exhibited a patient with complete detachment of the retina, the whole membrane being studded with deposits of cholesterin and in addition moderate deposits of cholesterin crystals in the vitreous. In the left eye of another patient reported as Case 2 in his original report in 1917, there was an excessive development of well formed snowball opacities. There were several other patients in which the condition was less pronounced and might have been available for contrast, but several that were followed up, had died, moved, or would not present themselves. The differences in the two opacities that had been referred to in previous communications, could be readily determined.

The case exhibited was the first true instance of synchysis observed in over 16,000 new cases seen during the past six years, and this disregards the new cases in other clinics from which certain suspicious cases could be examined; these invariably proved to be types of snowball opacities. True synchysis scintillans is undoubtedly a rare intraocular condition, especially so where there is an absence of similar deposits in the retina. Not more than two instances of the latter type could be recalled from hospital and private experience. The old statistics bearing on this subject must be wholly unreliable.

Greater strides will doubtless be made in the study of conditions pertaining to the vitreous, lens and other ocular structures when further advances are made in biochemistry and more attention is paid to this important branch by ophthalmologists. At the present time, it offers a splendid and increasingly important field to the younger generation, especially since the corneal microscope with slit lamp illumination has been added as a valuable adjunct to scientific research.

We have all seen cases where the intraocular examination revealed a "small circulation" independent of sclerosis. Have these cases any relation to ciliary complaints or in fact to other ocular discomfort? Finally, could some of our ciliary complaints be due to the presence of circulating vasoconstricting or vasodilating substances?

Eye Lesions of Skin Diseases.

DR. EDWIN B. MILLER said that *favus* of the eyelid is quite rare and is mistaken for blepharitis marginalis. There are but two such cases on record. The

case presented this evening is the third reported in which there is involvement of the skin of the lower eyelid, without infection of the cilia. (See also p. 6 for one case.)

Stelwagon describes *hydroa vacciniforme* as a rare vesicular disease usually seen in boys (with only two or three exceptions); it occurs upon uncovered parts especially the nose, cheeks and ears. The lesions begin as red spots, discrete or in groups, rapidly exhibit vesiculation and later umbilication; the contents become milky dry crusts, which fall off and leave small vacciniform scars. Fresh outbreaks may take place almost continuously, and the process goes on indefinitely, at least up to young manhood, when the tendency subsides. Its activity is usually limited to the warm season. The first observation was that of Bazin, in 1862.

Examination of this case under discussion, revealed photophobia, lacrimation and considerable flushing of the bulbar and tarsal conjunctiva. The left cornea showed a narrow band of roughening about 2 mm. wide, extending along the limbus from two to five o'clock. This did not stain with fluorescein and presented the picture of multiple phlyctenules. From this band, extending in on the cornea were several fine gray striae having the appearance of striped keratitis. Von Pirquet showed negative reaction. Treatment: Atropin and hot compresses every three hours, and the diet regulated. The eye cleared up within a week. There was no recurrence.

Early Gumma of the Iris with Late Secondary Lesions of the Body.

. . . 47 years of age, colored, came to our clinic suffering from a growth in the right eye, which had developed within a week. Vision—O. D. fingers at 1 foot. O. S. 20/20.

Examination showed congestion of bulbar and tarsal conjunctiva with a hazy cornea at the limbus; at seven o'clock there was a marked staphyloma. Back of the staphyloma at the root of the iris, was noted a growth about the size of a small pea, which pushed the cornea forward. The pupil was irregular with several posterior synechiae, but reacted in the clear areas to light and accommodation. Fundus view was not obtainable. O. S. appeared normal in every respect. Diagnosis—gumma of the iris. The patient was admitted to the house and referred to Dr. Schamberg's clinic for Wassermann test and treatment. Antiluetic treatment subsequently administered caused rapid absorption of the growth.

Discussion: Dr. Greenbaum referred first to the patient with active syphilis and a negative complement fixation test. In this connection he said it was very important to remember that with the new Kolmer modification of the Wassermann reaction, a positive reaction always means syphilis, but a negative reaction does not by any means exclude that disease. There are conditions in which the reaction may be negative, despite the presence of actual syphilis. It may be and often is negative in congenital syphilis; in the early days of chancre and very occasionally, as in this instance, during the secondary state; in the late syphilis the percentage of negative reactions is greater; in patients insufficiently treated the reaction becomes negative and may stay so for a number of weeks; in patients sufficiently treated with previous strongly positive reaction, it may likewise become negative, but as treatment is continued becomes positive again for an indefinite period.

The patient with hydroa vacciniforme is very interesting from the view point of both dermatologist and ophthalmologist. It has been shown that almost all cases of hydroa vacciniforme have a hematoporphyrinuria. Hematoporphyrin is an exudation product of hemoglobin—in reality an iron free hematin. It is photosensitive and circulating in the blood. It is presumed to be the basis for the development of the skin lesions. It is not hard to conceive of a similar action on the exposed surfaces of the eye. The striking effect of heat is well illustrated in this child; yesterday morning there were no lesions on the face at all. At noon the child went close to a forge and within two hours the numerous lesions noted had developed.

The child with favus is also very interesting because of its extreme rarity. In this case the causative organism is not the human parasite (achorion schoenleinii), but the mouse or rat parasite (achorion quinckeanum). The sulphur yellow crust, which all species of acho-

rion produce, may be seen on my own skin, which I have inoculated some three weeks ago, for the purpose of studying certain immunologic reactions occurring with the ringworm organisms.

DR. C. E. G. SHANNON, Clerk.

THE PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

December 10, 1923.

DR. E. B. HECKEL, Presiding.

Tuberculosis of Iris Cured with Tuberculin.

DR. EDWARD STIEREN reported the case of F. L., a Swede, age 25, who appeared June 28th, 1923, with a vague history of having received some dust from tar paper in his left eye.

The eye was irritable, with considerable photophobia and lacrimation. At the pupillary edge, below, there was a brownish-red elevation with a one millimeter base. Under atropin, the eye became quiet in 24 hours, the pupil dilating freely in all directions except below, giving the pupil a kidney shape, altho there was no posterior synechia.

A diagnosis of either tubercle or gumma of the iris was made. The size and site of the lesion was in favor of the latter, but the absence of inflammatory phenomena, so universal in gummata, strengthened the tuberculous theory and the patient was accordingly admitted to the Tuberculosis League Hospital.

The wisdom of this is attested by the accompanying letter from Dr. Marcy after the patient had been cured by successive injections of Koch's O. T. The tubercle gradually became smaller from day to day and had entirely disappeared seventeen days after admission, the resulting vision being 6/5—. The pupil did not regain its normal shape, but remained flattened at the bottom. There is a round area of atrophy of the iris at the site of tubercle thru which the light shines on transillumination.

The following is the summary of DR. C. HOWARD MARCY in the case:

"Admitted to the hospital complaining of dimness of vision in the left eye and photophobia, with suspected tubercle of the left iris.

Physical examination: Height, 5 ft. 7½ in. Weight, 143 lbs. Normal development. Well nourished and general appearance good. Physical examination of chest was negative except for slight increase of breath sounds over the left hilus region. Left pupil dilated and irregular. A small pinhead sized nodule was present on iris.

Dental examination: General condition of teeth was good. Dentist recommended extraction of one tooth.

Stereoscopic X-ray plates of the chest showed the following: The right lung field fairly clear thruout. The right root is broad with numerous striations, one of which extends up into the apex. The left apex is clear. Inner halves of first and second interspaces show faint mottling. Rest of lung field clear. The left root is fairly broad with striations extending up into the apex. Heart and mediastinum normally placed. Other features negative. Plates suggest an old tuberculous infiltration of the left hilus.

Temperature, normal. Pulse, average 72. Repeated examinations of sputum were negative for tubercle bacilli. Urine showed very slight trace of albumin but otherwise was negative. Blood pressure: systolic, 132; diastolic, 84. Blood Wassermann, negative.

Intradermal injection .000001 gms. Koch's O. T. was faintly positive. The dose was increased .00001 gms., .00005 gms. and finally .0001 gms. This final dose gave very strong local reaction without focal or constitutional disturbance and should be the dose continued at two weeks intervals if further tuberculin treatment is considered advisable.

Closure of Branch of Central Retinal Artery.

DR. GEORGE H. SHUMAN presented the case of P. J. K., male, age 30 years, who came Nov. 3, 1923, for obscured vision in right eye. Two days previously, just after having driven an automobile to work in the morning, patient experienced a sensation in his right eye which he described as feeling as tho he were going from light into a dark room. There was no pain or other subjective symptom. Ophthalmoscopic examination revealed a typical picture of closure of the upper temporal branch of the central retinal artery. An area of opaque retina, triangular in shape, wtih apex at the disc was seen in the superior temporal quadrant. Its inferior portion, which ap-

peared quite white in color, was sharply differentiated from the normal retina below by a wavy border which passed thru the fovea centralis. The superior portion faded gradually into the normal red fundus.

The diagnosis was clinched at the outset by the fact that a broken column of blood, the socalled "granular current," was seen in the upper temporal branch of the central retinal artery when the opthalmoscope was first approached to the eye for examination of the fundus details by the direct method. This was not seen again after the patient's first visit. The fundus was otherwise negative and showed no evidence of angiosclerosis. Central vision was 20/200. There was a positive and absolute scotoma in the inferior nasal field.

Patient stated that he has "heart trouble," which was found, on inquiry of his physician, Dr. I. H. Alexander, to be an endocarditis of long standing. The occulsion is therefore probably embolic in character.

Left eye had normal vision and showed no abnormality or evidence of angiosclerosis.

Herpes Zoster Ophthalmicus.

Dr. Edward A. Weisser reported the case of W. M., age 6, who was first seen on October 21, 1923. History of right eye having been sore one week, with photophobia and increased lacrimation. Diagnosis of herpes zoster ophthalmicus was easily made, from vesicles along the right trigeminus, first branch, from the upper lid to the scalp. The cornea was likewise involved, with intense irritation and some ciliary injection. The child was put on atropin, dionin, bichlorid ointment and pressure bandage. Zinc oxid was applied to the skin lesions.

The vesicles on the skin became purulent, then broke down, healing with scars which are still present. Corneal vesicles likewise broke down, leaving clean ulcers, which healed with scars.

All injection, photophobia and increased lacrimation have disappeared and the child is using dionin and bichlorid in the hope of absorbing the scars. The case is reported by Dr. Weisser because it is the first case of herpes zoster ophthalmicus he has seen in a child.

George H. Shuman, M. D.,
Secretary.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

November 12, 1923.

Dr. Robin Harris, Presiding.

Foreign Body in the Orbit.

Dr. James B. Stanford reported this case.

On July 13th, 1923, P. C., white, 16, was holding a punch, which was being struck by a large hammer in the hands of a fellow workman, when a piece of the hammer broke and injured the left eye. He was referred to me on July 17th, by Dr. J. L. Beauchamp. Examination of the left eye showed no wound, but revealed the following facts: A wound in the skin at the nasal end of the left eyebrow, marked chemosis of lids, pupil active but smaller than its fellow, and the motion of the left eye limited upward and inward. The vision was limited to 6/200, and ophthalmoscopic examination discovered large vitreous opacities, but no other details could be seen.

X-ray examination showed the left frontal sinus dark, a hole in the floor of the frontal sinus, and localized a foreign body 5x8x10 mm., 13 mm. above the horizontal plane of the cornea, 14 mm. to the nasal side of the vertical plane of the cornea, and 18 mm. back of the center of the cornea. Interpretation of the plates convinced me that a large, flat, foreign body had passed thru the frontal sinus into the orbit and was resting with one edge embedded in the sclera back of the equator of the eye.

On Nov. 8th, an unsuccessful attempt was made to remove the foreign body, under local anesthesia. An incision was made in the bulbar conjunctiva, between the superior and internal recti, and blunt dissection was practiced back to the vicinity of the metal. On the following day, under general anesthesia the same route was followed, and the foreign body was removed. After reaching the metal, attempts were made to withdraw it with the magnet, but it had become too firmly encapsulated, so it was freed by cutting down upon it with the scissors until the magnet was able to remove it.

When I saw this patient last, on Sept. 7th, 1923, his vision was 20/100, his ocular movements were normal, and the ophthalmoscope showed a large area of retinal and choroidal atrophy, beginning

3 dd. above the disc, and extending as far forward as may be seen. This area was about 3 dd. wide. There appeared to be some excess of pigment in the macula, and a few vitreous opacities were present.

Intraocular Foreign Body.

DR. JAMES B. STANFORD. On June 23rd, 1923, J. R., white, about thirty-five, was holding a bar while another workman struck it with a hammer. The bar splintered, and several pieces of it struck J. R. in the face, one piece striking the right eye. The patient went to see Dr. W. G. Alford, who referred him to me, but before coming to me on June 24th, his wife attempted to remove the foreign body. Examination revealed an abrasion of the right cornea, up and in, and a small spicule of metal in the anterior chamber under the abrasion. The foreign body was about 2 mm. long, by about ½ mm. in diameter, and was free in the anterior chamber, except that one end of it appeared to be caught in the iris.

The patient was taken to the hospital and a very small keratone incision was made at the limbus above. This incision was so small that very little aqueous was lost. The foreign body was then drawn by the magnet up to the incision, and then, using one blade of the iris scissors as a magnet tip, the foreign body was withdrawn without yet losing much aqueous.

When this patient was discharged on July 15th, his vision in the injured eye was 20/15, the eye was clear, and the pupil round and active and the same size as its fellow. A small corneal scar was evident.

Ocular Injury.

DR. ROBIN HARRIS reported the case of Mr. R., who was struck on the head April 29th, 1923 while walking along the street, supposedly with a brick. X-ray showed fracture extending thru orbit. I saw him May the 19th, 1923 when he could not see out of his right eye. Ophthalmoscope revealed nothing. Still has no vision and the nervehead has become very pale.

Unusual Laceration of the Eyelids.

DR. A. C. LEWIS reported that on Oct. 6, 1923 Mrs. L., age 20, while riding on the rear seat of an automobile was thrown violently against the top of the car when the car was ditched.

When seen by me an hour later both lids of the right eye were severely lacerated. The upper one was torn from the inner canthus thru skin, fascia, muscle and mucous membrane in a very jagged and irregular course to a point above the tarsus near the median line. This lid hung down well over the lower one. On the lower lid a long thin strip of skin, including the lashes, was torn to a point in the center of the lid margin nearly to the internal canthus.

After carefully fitting and anchoring with many fine silk sutures the torn tissue into position, the wound healed by first intention. The ptosis, which was marked, is rapidly clearing up and will probably disappear entirely in a few weeks and leave no deformity.

Altho the upper canaliculus was torn thru and the lower one displaced there is no epiphora, or other inconvenience from the injury. The remarkable thing about this case is that with a severe injury of this nature to the eyelids, there was none whatever to the eyeball.

Acute Uveitis Following Corneal Injury.

DR. A. C. LEWIS reported the case of Mr. L. P., who on Nov. 8, 1923, came from his home in Mississippi for eye treatment. Two weeks prior to this while logging was struck in right eye by the limb of a tree. Since that time has suffered great pain and has been under treatment at home by a local doctor.

Examination showed a perforating wound of the cornea near the limbus below. The whole eye was greatly inflamed and considerable hypopyon was present. Photophobia was marked; fundus examination not made. He has been confined in a dark room here in the hospital since that time and atropin, dionin, argyrol and hot applications have been used. The pain and inflammation have subsided so much that he won't consider enucleation as advised by me. The hypopyon has disappeared but the vitreous is almost opaque and a deposit can be seen on the posterior lens capsule. He claims to have light perception still but the usefulness of the eye is apparently destroyed. D. H. ANTHONY,

Secretary.

American Journal of Ophthalmology

Series 3, Vol. 7, No. 4. April, 1924

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

EDITORIAL STAFF

EDWARD JACKSON, Editor,
217 Imperial Bldg., Denver, Colo.
M. URIBE-TRONCOSO,
226 W. 70th St., New York City.
MEYER WIENER,
Carleton Bldg., St. Louis, Mo.
CLARENCE LOEB, Associate Editor,
25 E. Washington St., Chicago, Ill.
CASEY A. WOOD,
7 W. Madison St., Chicago, Ill.
HARRY V. WÜRDEMANN,
Cobb Bldg., Seattle, Washington.

Original papers, correspondence, and other scientific communications should be addressed to the Editor. Books for review may be sent to any member of the editorial staff. Reports of society proceedings should be sent to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Ill.

Proof should be corrected, and returned within forty-eight hours to the printers. Reprints may be obtained from the printers, Tucker-Kenworthy Co., 501 S. La Salle St., Chicago, Ill., if ordered at the time proofs are returned. But reprints to contain colored plates must be ordered when the article is accepted.

Copy of advertisements must be sent to the Manager by the fifteenth of the month preceding its appearance.

The annual subscription for the JOURNAL and the OPHTHALMIC YEAR BOOK is eleven dollars, in advance.

Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to the Manager of Subscriptions and Advertising,

JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

NEW TRUTHS IN OPHTHALMOLOGY.

In rereading, with profit, a brochure with the above title by a highly esteemed colleague, I have just come across the following conclusion to his description of the father of all tucks: "The operation described above I have done many times, with much satisfaction. Even if it had been devised by someone else, I think I would prefer it over the very best advancement operations, and for the reasons given." Aside from its refreshing frankness, this remark suggests reflections of some practical value.

While most of us are inclined to think too much of our own ideas, operative and otherwise, we are too apt to view the products of other minds with a somewhat fishy stare. There are innumerable more or less good operations which are done only by their authors; and a little delving into the pages of old journals reveals an astonishing number of good things that have sunk into oblivion or have been preserved from such a fate by the luck of having been rediscovered or reinvented under a new name. We all need as much help from our confreres as we can get, and to get such help it is necessary to cultivate the open mind; the habit of reviewing, so far as humanly possible, the operations and methods of others as if they were our own.

A not uncommon experience, in trying out a new operation, is to obtain better results the first time it is done than one gets later on. Part of this may be accidental, but part is probably due to the greater care exercised, at first, in following, exactly, the detailed instructions of the originator of the method. Therefore in all operations that are done so seldom that one forgets, between-times, the experience of previous efforts, it is decidedly worth while to go back, before a renewed attempt, to the original description. In this class of operations, it is also of great value to have, in the operating room, a description of the minute difficulties in technic, which presented themselves at the early trials and the methods evolved to overcome them. If such an account were reread each time before beginning the operation, the operator would not have to make the same mistake several times, before his patients get the full benefit of his experience.

Inattention to the detailed description, however, is not the only reason why

many good operations are done by their authors alone. The fault is often that of the inventor, who in his original description fails to put himself into the place of his readers, and leaves out minute but important details which subsequent operators have to learn from experience; or failing in this they abandon the operation in disgust.

To the old medical war-horse, the review of his coltish exploits is not without advantage. Along with the recognition of the follies and futilities of his youth he is sometimes surprised that he did some things so well and wonders whether he could do as well again. When in this complacent frame of mind he may even murmur to himself Mauthner's famous remark: "When I want to read something real good I shut myself up in my room and read my own works."

H. G.

THE EYE CUP.

The eye cup is found in general use, either on the initiative of the patient, himself, or as the result of the advice of the oculist. The theory underlying its use is that the solution employed penetrates into all of the recesses of the conjunctiva, and removes the products of inflammation. This should lead, as elsewhere in the body, to a rapid improvement in the condition under treatment. It is presupposed, first, that there is a necessity for removing artificially the contents of the conjunctival sac; and second, that this is best accomplished by the use of the eye cup.

This theory has been generally accepted without a careful scrutiny of the facts. A priori, it would seem that if drainage elsewhere is beneficial, it should be equally so in the eye. And how could drainage be better effected than by flushing of the sac with large quantities of an aseptic or mildly antiseptic solution?

In the first place, it is open to question whether the conjunctival sac requires artificial aid in emptying itself of the products of inflammation. The conjunctiva is open towards the surface of the body, so that normally there is free drainage towards the nose, or, in case of obstruction of the lacrimal passageways or excess of secretion, thru the palpebral orifice over the cheek. It is true that there are recesses in the conjunctival sac where secretions may accumulate, but these are being constantly massaged and emptied by the movements of the lids, aided by the vis a tergo of the tears.

Except in cases of gonorrheal or diphtheric conjunctivitis, the amount of secretion found in the conjunctival sac on separating the lids is not great, even in severe acute conjunctivitis. This does not mean that there may not be a large amount of secretion present. It simply means that it is not confined within the conjunctival sac. It is found escaping between the margins of the lids and adhering to the eyelashes. Except in the cases of the two diseases mentioned above, it is rare to find a large amount of exudate in the conjunctival sac except in the early morning, when absence of movements of the lids during the night, coupled with the adhesion of the lid margins due to the drying of the secretions, has caused its retention.

At this time, the eye cup might be used with advantage, but the same result can be obtained, with less discomfort, by simple cleansing of the lid margins. But *the cleansing must be thoro.* All traces of the secretion must be removed. As soon as the palpebral orifice is free from the dried secretions, the retained exudate appears, and may be similarly removed, following which the contents of the conjunctival sac are mechanically removed as normally. It is, therefore, not true that in the great majority of cases there is any necessity for artificially emptying the conjunctival sac by flushing it. All that is necessary is that lid margins shall be kept clean, so that the secretion may escape between them.

Secondly, if a normal eye is subjected to the use of eye cup, it will subsequently feel hot and uncomfortable, due largely to the induced increased blood supply and the presence in the sac of an abnormal amount of fluid and salt content. If one will recall the tearful days of childhood, he will remember how uncomfortable his eyes felt after a crying spell. The same sensation is felt in pathologic conjunctival conditions after

the use of the eye cup. Instead of the discomfort due to the secretions being relieved, it is frequently accentuated.

On the other hand, after a simple cleansing of the lid margins, the eye tends to become comfortable. Pledgets of cotton or gauze, well moistened with a mild solution (boric acid or whatever the physician prefers), are used with a gentle wiping motion, until all of the secretion is removed and the eyelashes are macroscopically free. The number of times daily that this must be done depends, of course, on the severity of the conjunctivitis. In the many cases that the writer has advised that this method be substituted for the use of the eye cup, there has been a unanimous approval of the change, and the results have certainly been as favorable.

In the two diseases mentioned above, the swollen condition of the lids in gonorrheal ophthalmia prevents the use of the eye cup, and the large amount of secretion requires lavage at the hands of a nurse or physician, altho here, too, cleansing of the margins of the lids aided by gentle massage to expel the secretion from the conjunctival sac is of the greatest help. In diphtheric conjunctivitis, the tenacious, adherent membrane cannot be removed by any force exerted thru the medium of the eye cup, and its use is therefore of no value. In all cases, therefore, simple cleansing of the margins of the lids has a therapeutic value at least equal to the use of the eye cup, and is certainly more convenient and comfortable. It is the writer's firm conviction, that the eye cup is a useless and even mildly detrimental part of the oculist's armamentarium.

C. L.

MacCALLAN LEAVES EGYPT.

"In recognition of twenty years' work done by Dr. A. F. MacCallan C.B.E., F.R.C.S. Deputy Director General of Public Health, Egypt (Ophthalmic Section), and on his leaving the service, the Medical Staff of the Hospitals, as well as members of the Ophthalmological Society of Egypt, held a farewell party at the Continental Hotel, Egypt." This item of news comes to us from Cairo.

MacCallan started work 20 years ago with only two travelling hospitals, and he now leaves a well organized system of ophthalmic relief composed of five travelling and nineteen permanent hospitals, with a large staff, all native surgeons trained in Egypt in the School of Ophthalmology which he established. He deserves a high degree of esteem and respect, and the Egyptians appreciate this public benefactor, for what he has done for the minimizing of a great scourge of their country, blindness; and the development of their educational resources and opportunities.

This work in certain directions is also worthy of recognition by all opthalmologists, particularly those of English speaking countries. It is no small contribution to the advancement of ophthalmic science that has come out of Egypt in the last twenty years, some of the best of it has come over MacCallan's name; but much of it has come from ophthalmologists that followed him to Cairo, or were made ophthalmologists in the hospitals and the school which he created. It was an exhibition of rare foresight, to perceive the possibilities for good in the organization and development of ophthalmic service in Egypt. The achievement was sufficiently spectacular to arrest attention, in competition with the spectacular achievements of aseptic surgery and the control of epidemics. We, who understand its solid worth and vast importance, should ensure its appreciation by the general medical profession and the public. By doing this, we will extend the appreciation of all ophthalmic service.

There has been delay in publishing the annual report on ophthalmic hospitals in Egypt; and an eight page abstract of that for the year 1922 has been issued, which calls attention to its most important features. This might well find a place in every ophthalmic library. Possibly, copies may be obtained by asking for them of Mr. MacCallan, at his new address, 33 Welbeck St., London, W. The profession of England, which has sent out such men as MacCallan, Elliot, Kirkpatrick, Herbert and Henry Smith, has a claim on their assistance when, in mature years, they become less fitted for strenuous work on the frontiers and in the outposts of civilization. E. J.

BOOK NOTICES.

Oogheelkundig Jaarboek, Third Volume, 1923, Edited by H. Snellen, Jr., E. Marx, H. Weve, G. F. Rochat, W. P. C. Zeeman and G. J. Schoute, Published by the Netherlands Ophthalmological Society. Cloth, 284 pages, illustrated. Rotterdam, W. J. Van Hengel.

This "Yearbook" of the Ophthalmological Society of Holland is so different from any other "yearbook," that it is worth while to give a somewhat detailed account of it, especially as its publication is now to be discontinued. It combines some of the features of "year books" issued by social organizations, the annual "transactions" of scientific organizations and a compilation of statistics of the public institutions of Holland devoted to ophthalmology.

What might be called the yearbook—printed exclusively for this work—consists of ninety-three pages. It begins with a table of contents and preface. Then come two pages of Ophthalmic Anniversaries," arranged by months, thus: Birthday of Louis Braille, Jan. 4, 1809; death of H. Snellen, Sr., Jan. 18, 1908; Official opening of the Nederlands Hospital for Eye Diseases at Utrecht, May 2, 1859; Opening of the Polyclinic for Eye Diseases at Utrecht, Nov. 6, 1858, etc. There are some pages of notes about H. Snellen, Sr., with a portrait. Then come lists of members and honorary members of the Society, and of those who practice ophthalmology exclusively, in Holland or in the Dutch Colonies. There is a list giving addresses of members, dates of graduation, admission to the Society, Hospital and other appointments, etc.

There are lists of ophthalmic journals of the different countries of Europe, and of works published on ophthalmology since 1920. There is even the announcement of Professor Vogt's course at Zurich on slit lamp microscopy Sept. 1923. There is a historical sketch by Professor Schoute of Johan Palfijn, Holland's famous oculist of the early eighteenth century, whose name is associated with that of Brisseau in the early understanding of cataract. There is also a scientific paper by H. Weve, reporting a case in which part of the tendon of the elevator of the upper lid was transplanted for total paralysis of the superior rectus muscle.

Then, there are almost twenty pages of statistics of cases and operations in the various eye clinics and hospitals of Holland for 1921. There are abstracts of articles on ophthalmology, of Dutch authorship, appearing in 1922. These are arranged alphabetically by the author's name. Then comes a list of institutions for the care and assistance of the blind in Holland, arranged alphabetically by the names of cities.

Following the above are reprints. First are the reports of meetings of the Society in 1921 and 1922. Then come reprints of about a dozen papers that have been published by members of the Society. Most of these are published, like all the preceding parts, in Dutch, but there are also some in French and English.

The different original ideas that have been worked up into this "yearbook" give it especial interest and value. E. J.

The **Ophthalmic Year Book,** Volume XIX. Edited by Edward Jackson and William H. Crisp. Published by the Ophthalmic Publishing Company, Chicago, July 1923.

The 18th volume of the Ophthalmic Year Book comes out in the original style in one bound volume. For the active practitioner this is the only form in which the book is convenient and we are pleased to see its resumption. The digest of the literature is gotten out by a large number of active workers under the supervision of Dr. Edward Jackson and Dr. William H. Crisp. The abstracts are sufficiently extensive to permit of quotation without referring to the original article.

Dealing as it does with the ophthalmic literature of the world, published in many languages, much time and expense and effort are saved the earnest research worker and author in compilation of data for essays; and may save him from much repetition, as it may be found that others have arrived at the same conclusions on the subject under study. (See also A.J.O., v. 6, p. 860.)

H. V. W.

Fundamental Reading Habits: A study of their Development, by **Guy Thomas Buswell.**

Remedial Cases in Reading: Their Diagnosis and Treatment, by **Wm. Scott Gray.**

Silent Reading: A Study of the Various Types, by **Chas. Hubbard Judd** and **Guy Thomas Buswell.** Published by the University of Chicago.

The present day teaching of reading has been greatly advanced by new methods of diagnosis. Probably the most important method is a study of eye-movements. Apparatus has been devised to photograph the eye-movements showing the number of pauses or fixations made in reading a line, their duration in seconds and the number of regressive movements.

The following list of elements of the reading process and its development will give a general indication of the kind of changes which may be detected thru such a study of eye-movements.

1. The development of a broad recognition unit as measured by the average scope of eye-fixations.
2. The development of habits of quick recognition, regardless of the size of the unit, as measured by the duration of fixation pauses.
3. The development of precision of recognition and regularity of progress across printed lines as measured inversely by regressive or backward movements of the eye.
4. The development of habits of expression or recognition in terms of thought units as measured, by the oral process, by timing the rhythm of pronunciation.
5. The development of independence in recognition.

Plates are shown of the photographic records of students from the first grade to college. Cases are cited and remedial measures given. Silent reading has been found to differ so greatly from oral reading that both methods are now employed in class-work. The photographic records of the eye-movements in the two methods of reading are found to differ greatly. There is, strangely, no mention in any of the monographs of possible defective vision or ocular muscle anomalies, important factors which seem to have been disregarded.

F. B.

"Industrial Health," Edited by **George M. Kober,** Washington, D. C., and **Emery R. Hayhurst,** A.M., M.D., Ph.D., Columbus, Ohio. Published by P. Blakiston's Son & Co., Philadelphia, 1924.

The editors, with a staff of thiry-three collaborators of the medical, legal and engineering professions with social and economic experts, have made an exhaustive and systematized, yet succinct and clearly given, study of the various phases of human health in vocations.

The improvement of health conditions and the prevention of accidents in the trades of America has largely been accomplished since the birth of the American Public Health Association in 1880. There was but little writing done before, and little effort made to apply the principles advised. The English and the Germans had done most of it to that date. Perhaps the most clearly written book, or essay upon the subject, was that of Kober and Hansen in 1916 on Diseases of Occupation and Vocational Hygiene.

The most rapid advance has been made since the World War, dating from the subsection of the Council on National Defense on Industrial Medicine in 1917, followed by the executive order of President Wilson, establishing the United States Bureau of Public Health, which aside from the Medical Services of the Army and Navy takes charge of Health matters relating to U. S. Employees, and we medical men now find its officers rubbing shoulders with ours. The Workman's Compensation Bureaus of most of the States now take charge of most industrial accidents and affections—all of which surely constrict the field of the private practitioner.

Part I of the book deals with the general principles of maintaining Health in Industry; Part II, Vocational Hygiene of Certain Industries and Callings; Part III, Specific Occupational Diseases; Part IV, Systemic Occupational Diseases; Part V, General Principles of Industrial Health Administration.

Certain specialized material has been prepared by highly trained and experienced men, and is given in the words of the specialist and scientist, modified for the understanding of the general reader. The general method of the book, however, is to present that which all should know in the language of the intelligent lay person. Hence the book should prove of great help to industrial executive staffs, and its principles of vast benefit to labor as well as to teachers and State officials.

Among these technical subjects are those on occupational affections of the nose, mouth and throat, by Legge, on the ear by Blake, skin by Bowen, Blood Circulatory System and Kidneys by Lee, The Relations of Cancer and Occupation, X-ray and Radium by Tyzzer, and ordinary and occupational affections of the Eye by Würdemann in the latter of which our readers would be most interested.

This collaborator takes up the subject from the etiologic and preventative standpoint under the headings of:

1. Injuries from Accidents. 2. Diseases Due to Occupation Involving Excessive Eyestrain. 3. Diseases Due to Excessive Light and Heat. 4. Systemic Poisoning Causing Loss of Sight. 5. The Estimation of Economic Damage and Laws Relating to Compensation.

Even tho the workman is given good quarters, protected from accidents by protection devices, the larger proportion of eye (and other) accidents are caused by contributory negligence. But the enforced regulation of trades by health inspectors, and the installation of protection devices reduces the accidents and acquired disease to a minimum, far less than it would be without the employers' forced cooperation.

Most industrial managers now realize that the output of work is greater and better, if the workman is not only protected but also instructed and made to protect himself. So the policy is not only humane but it also pays—hence the really lessened number of ocular accidents and occupational diseases of the eye in proportion to the workmen engaged in skilled professions within the last few years. The writer is yet of the opinion that a rating of economic loss may be estimated by the formula of Magnus and Würdemann, agreeing in results with the schedules evolved by the U. S. Treasury Department in disabilities of war veterans,—agreeing with those of England, France and Italy; with the experiences of disabled men in their earning powers after such disabilities and with the emperical awards of the courts for damages.

H. V. W.

CORRESPONDENCE.

Toxic Action of Cycloplegics.

To the Editor: The occasional occurrence of serious toxic symptoms following the instillation of atropin or hyoscin (scopolamin) into the conjunctival sac is a matter of some importance to the peace of mind of those habitually using those drugs for the purpose of determining refraction, and no doubt the paper of Dr. Samuel W. Green on Hyoscin Idiosyncrasy in the July number 166, and the letter of Dr. G. Henry Mundt in the November number of the JOURNAL have been read by many with interest.

The former seems to make a distinction between hyoscin and the scopolamin which we are commonly told are identical chemically and physiologically, and raises the question as to whether the use of scopolamin would have been followed by the same results.

About 25 years ago I commenced using scopolamin hydrobromid in 1 per cent solution instead of homatropin for my refraction work, at the suggestion of the late Dr. C. A. Oliver of Philadelphia. I have found it an exceedingly efficient cycloplegic, and have never seen any toxic effects tho it has been used in many thousands of cases and at all ages, unless sleepiness, and in a certain number of cases actual sleep from which the patient is easily aroused, can be so considered. Flushing of the face has been exceedingly rare.

My routine procedure is to use two drops only in each eye, one dropped on the inner surface of the lower lid while the patient is looking up, a part of this being expressed when the patient closes the eye, a second drop being instilled at the edge of the upper lid while the patient is looking down. Part of this is also expressed when the patient closes

the eye, so that the total amount retained is not more than one drop or 1/500 of a grain in each eye, or 1/250 altogether. The toxic dose of hyoscin (scopolamin) is stated to be from 1/100 gr. to 1/300 gr. The amount ordinarily used for cycloplegic purposes is well within the minimum toxic dose, and its efficiency has been demonstrated,—at least to my own satisfaction—by repetition on consecutive days and also by a comparison with the prolonged use of atropin in the same case.

I published a paper some years ago in the Ophthalmic Review on the efficiency of one instillation of scopolamin as a cycloplegic. Shortly after this the late Dr. Marple wrote to me that he had tried it in his out patient clinic but having had two cases of severe poisoning within a month, he had abandoned it.

Presumably the statement in Dr. Mundt's letter that a ½ per cent solution is equivalent to a 1-1000 solution is a printer's error. (Should be ½ grain to the fluid ounce. Ed.)

F. W. Marlow.

Syracuse, N. Y.

BIOGRAPHIC NOTICES.

WILLIAM WALLACE McCLURE.

S. Lewis Ziegler, M.D.

PHILADELPHIA.

The death of Dr. William Wallace McClure, on March 18, 1923, has robbed American Ophthalmology of a distinguished practitioner, who was one of the pioneers in this distinctive field of medicine. Born in Philadelphia, September 3, 1842, the son of John McClure and Anna McMullen, his fourscore years brought him a life of rich experience and well trained service to humanity. His preliminary education was acquired in the school at Andalusia and his medical training was received at the Jefferson Medical College, where he was graduated in 1864. He was appointed interne to the Philadelphia General Hospital, then called "Blockley," where he served for one year. About the close of the Civil War he was attached to the U. S. Hospital, "The Satterlee," which was located in West Philadelphia.

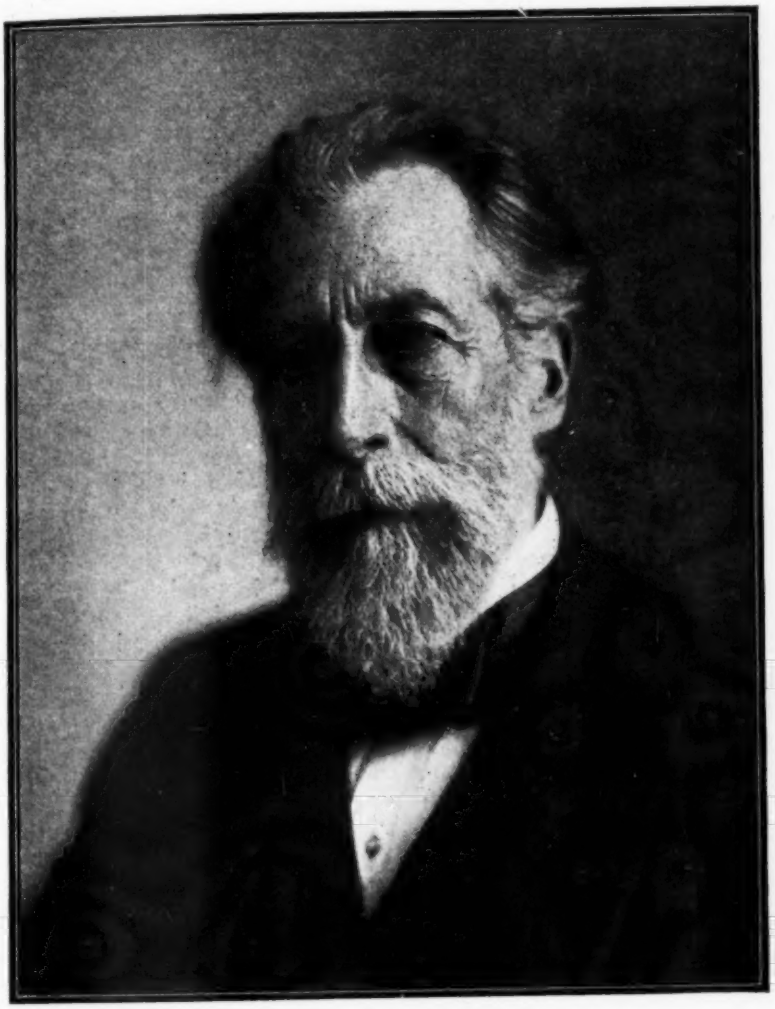
He began to specialize in ophthalmology on April 2, 1866, when he was elected a Resident Physician to the Wills Eye Hospital for the term of one year, serving under a staff of distinguished surgeons composed of Drs. George Morton, A. Douglas Hall, Richard J. Levis and D. Hayes Agnew. During the year following this service he went abroad to visit the European clinics where he spent some time under the "Master Ophthalmologists" of that day. His keen powers of observation served him well during his visit and because of the excellence of his home training he quickly skimmed the cream from the foreign clinics. He was particularly impressed with the work done in Stricker's laboratory in Vienna, with the wonderful surgical insight of von Graefe and with the wealth of material available for study in the continental clinics, bringing back with him a well filled volume of colored sketches of the work he had observed in Europe.

On his return to Philadelphia he was elected, January 1, 1868, an Assistant Surgeon to the Wills Eye Hospital on the service of Dr. Harlan, and in 1872 he was elected Ophthalmic Surgeon to the Presbyterian Hospital, which he served with fidelity and distinction until his retirement in 1886, when he was made Consulting Ophthalmic Surgeon.

When the Surgical Staff of the Wills Eye Hospital was reorganized in January, 1872, Dr. McClure was elected an Attending Surgeon along with Drs. Dyer, Goodman, Keyser, Norris and Thomson. Drs. Harlan and Morton were the only "hold-overs" from the old staff; while Drs. Hall and Levis, who had tendered their resignations, were re-elected in July of that year, after a six months' "moratorium." In 1873 Dr. Dyer resigned and Dr. Strawbridge was elected to fill his place. In 1874 Drs. Morton and Levis resigned but their positions were not filled. In 1877 Dr. Thomson resigned and Dr. Schell was awarded the vacancy. This staff of eight surgeons continued intact until the retirement of Dr. Strawbridge and the death of Dr. Schell in 1890.

Read before the Ophthalmological Section of the College of Physicians of Philadelphia, January 18, 1924.

Dr. McClure's early ambition stimulated him to inaugurate a course of lectures on the eye at the Wills Eye Hospital, that became very popular with the medical profession of Philadelphia, who crowded the front clinic room of the old Hospital to listen to them. He discussed the human eye in its minutest details and also presented studies in comparative anatomy, especially portraying the fundus appearance of birds and fishes thru stereoscopic slides. Among other things he exhibited a stereoscopic diagram of his new plastic operation for ptosis which clearly antedates (1867) the one we know as the Hunt-Tansley operation, altho the details are slightly different. For these lectures he stained and mounted many beautiful microscopic sections of the retina and other ocular tissues, which were far above the average of that day and generation. He likewise prepared some beautiful models of the eye and of its musculature, which Dr. Norris considered so fine that he frequently borrowed them for use in his annual demonstrations before the senior medical class of the University of Pennsylvania.



The late Dr. William Wallace McClure.

The great success of his course of lectures engendered envy in some of his colleagues, which ultimately resulted in

a rule being passed by the Board of City Trusts, in 1877, placing a partial embargo on teaching in the Hospital. From the effects of this rebuff he never quite recovered. He was a gentle genius, of brilliant mentality, but after this period he became reserved, almost secretive, in working out the newer problems in ophthalmology; but to those whom he knew intimately, and reposed confidence in, he expanded like the sensitive plant, and then one wondered why he did not publish the novel and interesting results that he had obtained. He never published his course of lectures and so far as the writer knows never publicly recorded any of his other work.

On his return from Europe he made many interesting and original studies of the ocular fundus and demonstrated the use of the Helmholtz ophthalmoscope to his colleagues. He was likewise one of the earliest to work out the intricate problems of astigmatic refraction, and succeeded in solving the high compound hyperopic astigmatism of his friend and colleague, Dr. Wm. Thomson, whose attention was thereby attracted toward ophthalmology as a specialty. The formula for this early refraction was as follows:

O.D. S+6.25 D ⌒ C+1.D ax. 45°
O.S. S+6.75 D ⌒ C+1.50 D ax. 75°

One can easily note the unusual character of this refractive error for that early day, since the plus spherical is extremely high and the cylinder axis is not according to the rule. When in later years Dr. McClure was offered the chair of ophthalmology at the Jefferson Medical College, he declined it because of his natural modesty and acquired distaste for teaching, and recommended that Dr. Thomson be elected to that position, which action was taken.

It is said that in those early days he would mark out the axis of the cylinder on paper, fasten his trial lens to it, place all in a tray and carry it down to the shop of J. L. Borsch for grinding. In discussing the problem one day, he and Borsch concluded that a protractor placed on the trial frame would obviate this, so that this protractor was added to the front of the frame. This was the first successful trial frame made in Philadelphia. There is no record of the exact year when this was done, but Dr. Louis Borsch, of Paris, recently confirmed the fact that he had often heard his father relate this tale about McClure. He also stated that Dr. McClure was one of the earliest to refract cases of mixed astigmatism with crossed cylinders, and that Borsch helped to work out the corresponding formula for grinding the equivalent spherocylindrical lenses.

Dr. McClure also deserves credit for the early addition of fractional numbers to the trial case in the strengths below 2 diopters, which he made up in eighth diopters to 1 D. and in quarter diopters to 2 D. At first, however, these lenses were in English inches. It was not until the advent of the French Nachet trial case that diopters were accepted in America. I have seen this early case of trial lenses. It was weird but workable, being made up of a variety of lenses in style and size, in order to fill out the sequence. At a later date he discarded this old case for one of the trial cases made up for the writer by Ivan Fox, having wide metal cells. Dr. McClure in this early period was par excellence the best practical refractionist in Philadelphia. While his hospital records were brevity personified, his private histories of refractive cases were the most voluminous and complete that I have ever seen, often covering more than a page of his record book. Instead of ordering full correction be made proper allowance for the accommodation and so made his patients comfortable.

The McClure iris scissors were invented by him in 1868, according to a statement recorded by him in a personal letter to the writer. They were first made up by J. H. Gemrig, and have been in continuous use at the Wills Eye Hospital for more than a half century. They have been marketed in Europe under the name of Dowel (Luer), McDougall (Weiss), and other wrong appellations, although no such surgeons ever existed. They possess delicate "balloon springs" which interlock at the tips, and when correctly made and properly sharpened are undoubtedly the best and most satisfactory iris scissors in existence today.

The writer, while serving as Resident

Physician to the Wills Eye Hospital, 1887-1889, enjoyed Dr. McClure's confidence in working out many surgical problems with him. Dr. McClure always came to the clinic early or remained late, so as to avoid contact with any critical eye while operating. He was a beautiful operator. His cataract incisions, iridectomies and incisions for the anterior sclerotomy of de Wecker were equal to those of his colleagues and often superior. His cases always recovered with a minimum of postoperative inflammation.

He was also a skilled therapeutist. His colleagues often commented with praise on the excellent results obtained from simple therapeutic suggestions made by him in consultation. Many jokes were passed about "Dr. McClure's Mixture" which some called his "Paint Mixture," composed of quinin and turpentine; but his results from the use of this mixture in iritis, chronic iridochoroiditis, rheumatic sclerotitis and other inflammations of this type were most convincing and fully justified its use. His wet compresses of quinin muriat exerted an undoubted bactericidal control.

His knowledge of certain collateral sciences enabled him to work out many interesting problems and made him an expert and connoisseur in various fields. During the World War he devoted all of his energies to the working out of a new and ingenious test for colored vision based on an entirely original theory, but it is not known whether he was able to complete this test or not. He had planned to present the result of these labors to the U. S. Government. He was a member of the Pathological Society of Philadelphia. The Historical Society of Pennsylvania and other learned societies, but in later years he resigned from most of them.

He was a well known collector of curios and Oriental rugs. These became his hobby. His valuable collection was mounted on the walls of his home and contained many fine examples of early Indian articles, Egyptian relics, Chinese curios, oil paintings and other rare and interesting works of art. His choice rugs from the Orient were always objects of admiration to experts.

His chief recreation was free indulgence in the sport of Izaak Walton. His periodical camping trips were greatly enjoyed by those who were fortunate enough to be his companions. Whoever participated with him in one of these hunting expeditions always wondered at the thoro preparation he had made, the complete and compact outfit that he carried and the unusual knowledge of woodcraft and piscatorial lore that he displayed. His ability as an expert rifle shot was well known.

Dr. McClure was married and had one son, Dr. Sorden McClure, who graduated from the University of Pennsylvania and was later associated with him in his Wills Hospital clinic. The unexpected death of this son, from a retropharyngeal abscess that suddenly ruptured and drowned him by entering the lungs, overwhelmed both parents with sorrow and caused Dr. McClure to gradually relinquish all of his work. He retired from the Wills Eye Hospital on Dec. 9, 1907, after an uninterrupted service of more than 40 years, and was made Emeritus Surgeon. He succumbed to cerebral hemorrhage. His widow alone survives him.

The writer is especially glad of this opportunity to place on record his personal gratitude to Dr. McClure for joining his colleague, the late Dr. Goodman, in recommending him to members of the Board of City Trusts and rendering material assistance in his election as Surgeon to the Wills Eye Hospital. Such an unselfish act of confidence and friendship was particularly gratifying to the writer in the early days of his career when no adequate return could be rendered.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Sondermann, R. Probing of the Tear Passages. Klin. M. f. Augenh., 1923, v. 70, p. 474.

Sondermann devoted, for more than twenty years, especial attention to the conditions of the tear passages. His observations convinced him that this field deserves much more interest from ophthalmologists for therapeutic measures. He also studied the lacrimal organs on fifty-five cadavers, almost exclusively of men from 18 to 47 years of age. A probe 0.9 mm. thick, could always be introduced without difficulty. The lower canaliculus showed, in 6.7% an intense stenosis, in 13.3% a slight stenosis, in 80% normal permeability. The tear sac showed no abnormality in any case. The lacrimal duct, mostly at a circumscribed place, rarely in its whole course, was very narrow in 40%, moderately in 29%, normal in 31%.

The author reached the following conclusions: 1. Stenosis of the lacrimal passages with consequent ocular disorders is much more frequent than so far supposed. Only a small percentage of mankind has tear passages free from stenosis. 2. The majority of chronic conjunctival catarrhs are due to lacrimal stenosis. Irritation of the conjunctiva frequently is the first symptom of stenosis. 3. Epiphora is not a necessary accompaniment of stenosis, but it is the more intense the nearer the stenosis is to the tear point. 4. Permeability of fluids does not exclude stenosis, even of high degree. 5. The structures described as valves, folds, etc., are most probably not of physiologic but pathologic character. 6. The poor results of probing are due to the fact that it is done when lacrimal disease is too far advanced. 7. The number of probings and the caliber of the probes should be reduced. 8. Probing is one of the most beneficial procedures at the disposal of the ophthalmologist.

C. Z.

Maucione, O. Treatment of Lacrimal Affections. Arch. di Ottal., 1922, v. 29, p. 233.

The author reviews Villard's summary before the French Ophthalmological Society in 1921 and the discussion upon it. It shows a marked difference of opinion among authorities as to the proper procedure in cases of lacrimal disease. Villard and some others advocate probing in very mild cases only and extirpate the sac in all others, but most authors reserve a place for probing. Maucione believes that a large number of cases in the class of mucous, purulent or mixed dacryocystitis with slight ectasia of the sac, can be cured permanently by conservative means. His treatment consists of stricturotomy where necessary, careful probing with small probes up to No. 6 (Bowman), probing being followed by injections of albargin, a gelatinous preparation of silver. The author attributes much of his success to this preparation which is nonirritating but germicidal and penetrates deeply into the tissues. He uses it in solutions increasing from .025 to .075 in strength. From five to ten injections with probing were usually sufficient.

Twenty-eight cases are described which secured apparently permanent relief with the above procedure, the cases having been followed from several months to as long as three years without recurrence. He concludes that extirpation of the sac should be reserved for luetic and tubercular cases, lacrimal fistulae, calculi, polypi, neoplasms and most cases of trachoma, altho in some cases of the latter his procedure has been successful. The West, Toti and allied operations should be reserved for special cases of mucocele, with osseous or nasal complications or with a marked ectasia. He believes that all other forms of dacryocystitis can be cured by the method outlined.

S. R. G.

Killick, Charles. Cataract Removed Under a Subconjunctival Bridge. The British J. of Ophth., v. 7, p. 320, No. 7, 1923.

The author feels warranted in expressing an opinion on the merits of this operation after a varied experience with some 1,500 cataract extractions done by various methods. He claims no originality, frankly admitting copying the method of Terrien.

The incision, puncture and counterpuncture made at the limbus, include nearly half the cornea. As soon as the section is made the knife is directed backward and made to glide beneath the conjunctiva as far back as possible, at least 6 mm. The width of the bridge varies, being sometimes one-third that of the corneal incision, but occasionally only 2 mm. broad. The ordinary technic is followed in expressing the lens, which of course is done subconjunctivally. Either the combined or simple operation may be done. If iridectomy is performed the author prefers to do it to the inner side of the bridge for the right eye and to the outer side for the left. In the series of 100 cases given in this report, fifteen were simple extractions. Only one was slightly marked by a small prolapse.

The lens is guided upward and laterally. The last traces of cortex are at times difficult to remove. Only fifteen times were eyes needled for after cataract. After the operation the edges of the wound coapt and are held securely in position by the conjunctival bridge while healing takes place. Patients get up on the third day or not infrequently twenty-four to forty-eight hours after operation; glasses are given on the fifth, sixth or seventh day.

The one positive contraindication that the author knows of is a narrow palpebral fissure. The method cannot claim to be an absolute safeguard against infection. Two of the series had panophthalmitis.

D. F. H.

Howard, H. J. A Conjunctival Bridge as a Safeguard Against Vitreous Loss in Cataract Extraction. China Medical Journal, vol. 37, No. 9, 1923, p. 709.

Howard finds that the extraction of cataract is more difficult on Chinese patients than on Caucasians. Among other difficulties, he specially refers to the narrower palpebral fissure and the greater spasticity of the lid sphincter. He finds that Chinese women are particularly prone to be excited following a cataract extraction.

To lessen the danger of loss of vitreous, Howard tried the conjunctival bridge operation as proposed by Lamb in 1913. His summary reads as follows:

1. The conjunctival bridge operation was first proposed by Desmarres in 1851, and has been performed by only a few ophthalmologists since then.

2. The writer began to do the operation in 1913, using a centrally placed bridge as suggested by Lamb. In 1914 he modified the bridge by making it somewhat on the temporal side, performing during the next two years over 100 cataract extractions incorporating this method.

3. The advantages of the temporally placed conjunctival bridges are:

(a) An effective safeguard against expulsive loss of vitreous during the operation and the period of convalescence.

(b) The possibility of using the eye speculum thruout the operation.

(c) The more rapid healing and a better apposition of the sectioned wound.

(d) The bridge can be made routinely in all cases and be later cut if there is no impending loss of vitreous or if there is too much difficulty in the delivery of the lens.

4. The disadvantages are:

(a) Some difficulty in a few cases in removing most of the lens cortex.

(b) It is sometimes difficult to replace the pillars of the iris, which occasionally results in an incarceration of the iris in the lips of the cicatrized wound.

5. The writer considers that the advantages greatly outweigh the disadvantages and recommends a trial of the modified bridge operation by others doing eye surgery in China.

H. J. H.

Selle, G. Healing in of Metal Globes after Exenteration. Klin. M. f. Augenh., 1923, v. 70, p. 176.

A man, aged 40, who had worn for 30 years without any discomfort, a goldfilled hollow globe of silver after exenteration of his right eye, on account of an injury, suddenly had increasing violent pain and inflammatory symptoms in the right orbit, which necessitated removal of the stump. The insertions of the muscles and the atrophic optic nerve were still present and also the scleral capsule. There was a cicatricial tissue of several layers, those next to the globe, infiltrated with fine, granular, black masses, probably particles of silver and formalin sediments. The next layer contained loose tissue, probably the remainder of the choroid, with numerous chromatophores and small celled infiltrations. The sclera showed large foci of lymphocytes and scattered chromatophores. It was assumed that after solution of the gold covering at some places of the globe, a disintegration and absorption of the silver occurred giving rise to the irritation. As the inflammatory foci were mostly located in the remaining choroid, the stump must be regarded as dangerous because of possible sympathetic ophthalmia.

C. Z.

Graves, Basil. Small Electric Ophthalmoscopes. Brit. J. Ophth. v. VII., No. 12, Dec. 1923, p. 562.

The author refers to the obvious advantages of this instrument in examining either eye of a patient whose head must remain in a fixed position. Many of the instruments on the market are not constructed with regard to the simple principles of illumination. Three factors influence fundus visibility: The extent of the illumination of the corneal surface area, the transparent media and the selected retinal area. Wide illumination is not desirable. Details are better studied with a concentrated illumination of only a small area. This affords a better contrast. Rather than a filament, producing a diffuse illumination, one with a single "end on" loop whose summit mainly provides the illumination, affords a reasonably restricted light source. The filament forms on the fundus a single straight linear streak of light. Instead of this being a disadvantage which makers have endeavored to do away with, it is of distinct advantage in examining the fundus. If the linear filament image is in the vertical, the macula is more easily seen, thru a small pupil. In searching the lens or vitreous with a +12 lens the linear streak horizontal is as useful as the vertical. Fine lens changes in the early stages are observed with great clearness. Certain types with very diffuse changes must be observed at a distance with a plane mirror, thus offording a concentration to the emerging rays of red fundus reflex. To detect fine floating vitreous opacities, using a fresh battery, a well concentrated focus and a +12 D. lens, focus on the vitreous with the optic disc forming an illuminated back ground.

The comfort and ease of use, the enhanced visibility of the lens and vitreous and the improved view of the macula recommend the electric ophthalmoscope as superior to the ordinary ophthalmoscope. D. F. H.

Sattler, C. H. Clinical Picture of Tobacco-Alcohol Amblyopia. Klin. M. f. Augenh., 1923, v. 70, p. 433.

Sattler reports his investigations with regard to the pupils, light sense and visual fields of the patients mentioned in his former essay on the causes of the increase of tobacco-alcohol amblyopia after the war. The pupils showed no disturbances. The absence of disorders of the light sense is explained by the fact that the rods controlling dark adaptation in the center of the retina, are very scarce in comparison to the cones and can hardly be affected in impaired central vision. The visual fields were examined with dot-perimetry, devised by Bjerrum. The scotoma was always in connection with the blind spot. In numerous cases the nucleus of the scotoma did not touch the center of the visual field, but lay between it and the blind spot, so that the term central scotoma is not correct for all cases of tobacco-alcohol amblyopia. The investigations showed how the form, magnitude and density of the scotoma may fluctuate. C. Z.

Orlandini. Retinal Detachment of Albuminuric Origin. Ann. di Ott., 1922, v. 50, p. 445.

From a review of the literature, it appears that this condition, tho commonest in pregnancy, is also met with in other cases of nephritis. It is distinguished from ordinary detachment by the fact that the tension is usually normal or even increased, it is usually bilateral, neuritis being common with it, hemorrhages are often found in the retina and occasionally true hemorrhagic detachment occurs. When the fluid is absorbed, there may be complete restoration ad integrum, functionally and ophthalmoscopically. The most unfavorable cases are those not associated with pregnancy, or where the detachment is already present before pregnancy begins. His first case, a woman of 38, had had nephritis for two years before visual symptoms occurred. Vision was reduced to one-half by a fairly large, greenish-looking detachment. This disappeared with improvement in her nephritis, but recurred twice, with final reduction of vision to hand movements.

His second case, a man of 50, was interesting because of the occurrence of an attack of acute glaucoma after the detachment had occurred. The glaucoma was relieved by an iridectomy, but vision had been lost. The third case was a man of 20 with severe chronic interstitial nephritis, from which he died six days after he was first seen. Vision was reduced at this examination to counting fingers with each eye by bilateral detachments. Sections showed marked edema of the nerve and retina, with hemorrhages into the retina. The relation was evident between the fluid beneath the retina and choroid vessels, and the choroid showed some collections of blood cells in its substance. The author believes that similar detachments occur only when nephritis has existed long enough to appreciably raise the blood pressure and has interfered with kidney function sufficiently for edema to occur. He has succeeded in producing edema of the retina about the nerve, with small hemorrhages into the retina, in animals from which one kidney had been removed, followed by cauterization of the remaining kidney.

S. R. G.

Worms, G. Subjective Visual Disturbances in Craniocerebral Wounds. Ann. d'Ocul., 1923, v. 160, pp. 456-470.

(1) Asthenopia retinalis. This is the most frequent complaint, even when the patient is emmetropic or properly refracted. The vision is perfect, but the patient tires after reading for a few minutes to half an hour. This condition is part of a general asthenia.

(2) Hyperesthesia retinalis. This is manifested under the symptoms of photophobia and blepharospasm.

(3) Vertigo. This is more or less constant, accompanies exacerbations of the headaches and sudden movements of the head. Sometimes there is a sensation of dazzling.

(4) Visual field. This is often contracted for form or colors. It may be of slight or of great extent, even to the point of a hemianopsia.

(5) Amblyopia. This is usually due to wounds of the occiput or of the optic pathways, but may be present following a simple concussion. The eyes may show a mild degree of choked disc. It is possible to have a concussion optic atrophy. There is also a group of cases in which there are no objective symptoms. In a large number of these cases, there has been found an ocular hypertension which was not accompanied by a general rise of arterial tension. The author suggests that this may be an etiologic factor.

Prognosis. About one-half of the patients recover completely, the amelioration of the condition being most pronounced the first year. Where this does not take place, the cause is a derangement of the sympathetic system, or persistence of slight lesions in the nerve centers.

C. L.

Lutz, A. Monocular Hemianopsia of Central Origin. Ann. d'Ocul. 1923, v. 160, p. 265-301.

This is an article which is largely theoretic, but which contains numerous references to the literature and drawings of visual fields, brain and optic nerves.

The conclusions are:

1. There can exist a monocular hemianopsia, the visual field of the other eye being normal.

2. This may be caused by an intraocular condition, such as glaucoma, detachment of the retina or obstruction of the retinal vessels, but also may be caused by a lesion of any part of the optic nerve tract from the lamina cribrosa to the calcarine fissure. Consequently, a monocular hemianopsia has no localizing value when viewed by itself.

3. It is very rarely caused by a lesion of the intraorbital part of the nerve or a lesion of the radiations of Gratiolet. Usually, the cause is located near the chiasm.

4. It is almost always caused by an extracerebral lesion.

5. It can be explained by the fact that the crossed and uncrossed nerve fibers form separate bundles and terminate in different cellular layers of the external geniculate bodies and the visual cortex.

6. It may be permanent or transitory.

7. It may be the remains of a binocular or monocular amaurosis, or of a bitemporal or homonymous hemianopsia, or even amaurosis.

C. L.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Jonathan P. Worrell, 80 years old, died February 22, 1924, at his home in Terre Haute, Ind.

Dr. L. Königstein, emeritus professor of ophthalmology at the University of Vienna, died recently at the age of 74.

Mr. Sydney Pritchett of London died recently according to a letter received by Dr. Ziegler of Philadelphia.

Dr. John William Stirling, Montreal, professor of ophthalmology at the McGill University Faculty of Medicine, formerly on the staffs of the Montreal General and Royal Victoria hospitals, aged 64, died Dec. 11, 1923.

PERSONAL.

Dr. Frank Allport of Chicago is spending the winter in St. Augustine, Florida.

Dr. Louis Stricker is in the Jewish Hospital, Cincinnati, suffering from gangrenous changes due to diabetes.

Dr. Harry S. Gradle and Dr. George F. Suker of Chicago sailed for Panama in January. They will return about the first of March.

Dr. Eugene H. Oppenheimer, a former citizen of the United States, has returned from Berlin and has located in New York, Thirty-one West Ninetieth Street.

Dr. G. Oram Ring of Philadelphia left on February sixteenth, in company with four of his friends for a three weeks' fishing trip in the waters of Southern Florida, on the House-Boat.

Dr. Robert Sonnenschein of Chicago was the guest of honor at the January meeting of the Louisville Eye and Ear Society. He addressed the society on the "Functional Tests of Hearing."

Dr. H. F. Shorney has been appointed by the government of South Australia, as Honorary Commissioner to inquire into and report upon ophthalmic matters in Great Britain and the continent of Europe.

Dr. L. Webster Fox was chosen to succeed the late John Wanamaker as president of the Board of Trustees of the Pennsylvania Military College, at the semiannual meeting held on February 8, in the Bellevue-Stratford.

Dr. Charles Sheard (Ph. D., Princeton) has been offered and has accepted the position as chief of the section of physics and biophysical research at the Mayo Clinic, Rochester, Minn., and expects to take up his new work early in March. He was the first professor and director of the work in applied optics at the Ohio State University. In 1919 he became connected with the American

Optical Company as head of the department of ocular and professional interests and in general charge of many of the scientific activities of this company. He has also been the editor of the American Journal of Physiological Optics since its founding in 1920. At the Mayo Clinic, he will devote his time and energy to the applications of physical science to the solution of physiologic and pathologic problems. He also expects to continue his activities in investigational work along the special lines of physiologic optics.

SOCIETIES.

The Sioux Valley Eye and Ear Academy held its semiannual meeting in Sioux City, Iowa, January 22.

The Section of Ophthalmology of the New York Academy of Medicine elected as chairman, Dr. Ben Witt Key, and as secretary Dr. David H. Webster.

The German Ophthalmological Society will this year return to Heidelberg for its meeting, June 12-14.

The Montana Academy of Eye and Ear Surgeons held its semiannual meeting at Anaconda, January 28. About twenty-five members were in attendance. Papers were read by Dr. Charles Coulter of Great Falls, and Dr. M. C. Pfunder of Miles City.

At the January meeting of the Ophthalmological Section of the College of Physicians of Philadelphia, Dr. Thomas B. Holloway was elected chairman and Dr. C. E. G. Shannon secretary of the section.

At the annual meeting of the Chicago Ophthalmological Society, the following officers were elected for the ensuing year: President, Dr. J. B. Loring; vice-president, Dr. Charles G. Darling; secretary-treasurer, Dr. Charles P. Small; councilor, Dr. Robert von der Heydt.

At the annual meeting of the St. Louis Ophthalmic Society, the following officers were elected for the ensuing year: President, Dr. Edward H. Higbee; vice-president, Dr. William E. Shahan; secretary-treasurer, Dr. John F. Hardesty.

The next meeting of the Ophthalmological, Otological and Laryngological Society will be held in Cleveland, Ohio, June 23-25. The headquarters are at the Hotel Statler.

The twenty-ninth annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will meet in Montreal during the week of September fifteenth, 1924. The scientific sessions will be held on the sixteenth, seventeenth and eighteenth. The section on instruction will be held on the nineteenth and twentieth. The guest of honor will be Lieut.-Col. Henry Kirkpatrick, formerly of India, now of London.

The president of the College of Physicians of Philadelphia, Dr. Thomas R. Nielson, appointed the following Fellows as the executive committee of the Section on Ophthalmology: Dr. George de Schweinitz, Dr. G. Oram Ring and Dr. McCluney Radcliffe. Dr. Radcliffe has just completed his two very successful years as chairman of the section and accepted membership upon the executive committee in place of the retiring member, Dr. Howard Forde Hansell, professor of ophthalmology in Jefferson Medical College. Dr. Hansel will leave for Europe early in June to remain abroad until late in September.

At the January meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, Dr. George E. de Schweinitz gave a most scholarly demonstration upon certain defects in the field of vision, associated with vascular variations from the usually accepted normal distribution of the vessels at the base of the brain. Dr. de Schweinitz, with characteristic generosity, referred to the classic anatomy work of Professor J. Parsons Schaeffer, of Jefferson Medical College, as forming the basis of his study. Professor Schaeffer opened the discussion with a further elaboration of this most important subject.

The January meeting of the Kansas City Eye, Ear, Nose and Throat Society was held at St. Joseph, Missouri. Dr. Harry Woodruff of Joliet, Illinois, was the guest of honor and conducted an operative clinic in the afternoon. In the evening session he spoke on "Choice of Method in the Operation of Senile Cataract." At the February meeting Dr. Edward Jackson was the guest, conducting a diagnostic clinic in the afternoon, with a paper and demonstration on "Case Records and Abbreviations" in the evening.

At the February meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, the following papers were read: "Operative Results in Cicatrical Ectropion," by Dr. William Zentmayer; "Case of Probable von Hippel's Disease," by Dr. J. M. Griscom; "Bilateral Metastatic Ophthalmitis," by Dr. T. A. O'Brien, by invitation; "Rupture of Iris Associated with Neuroretinitis," by Dr. Frederick Krauss; "Embolism of the Central Artery of the Retina during an Attack of Chorea," by Dr. H. M. Langdon.

At the February meeting of the Section of Ophthalmology of the New York Academy of Medicine, the following papers were read: "Symposium on Slit Lamp Microscopy of the Living Eye," by Dr. Bertha Drapkin, by invitation; "The Practical Value of Slit Lamp and Microscope," by Dr. Arthur J. Bedell, by invitation; "Photography of the Living Eye by Slit Lamp Illumination," by Dr. Charles Stevens. A general discussion of the papers followed.

At the joint annual meeting of the Manila Medical Society and the Philippine Islands Medical Association held Dec. 17-20, 1923, at the Philippine General Hospital, the members of the Department of Eye, Ear, Nose and Throat of the College of Medicine, U. P., presented the following papers: "Intracapsular Cataract Extraction with the Erisiphake by Drs. A. R. Ubaldo and A. S. Fernando; "Two Cases of Giant Size Dentigerous Cyst," by Dr. H. Velarde; "Lesions in the Nose and Throat in Tertiary Yaws," by Dr. Felisa Nicolas; "Fundus Lesions Among Filipinos,"

by Dr. A. S. Fernando; "Mixed Tumor of the Lacrimal Gland Removed by Kroenlein's Operation," by Drs. Velarde and Alcantara; "Suspension Laryngoscopy, Bronchoscopy and Esophagoscopy," by Dr. A. R. Ubaldo; "Bilateral Microphthalmia," by Dr. C. D. Ayuyao.

MISCELLANEOUS.

The Queensboro Home for the Blind has been opened at Richmond Hill, New York.

A sixty-bed trachoma hospital, equipped with special fittings to enable patients to feel their way by foot, and having walls, lights and windows of a color not injurious to the eye, will be constructed by the veterans bureau at Pikeville, Kentucky. Plans for the hospital—the first of its kind in the United States—are nearing completion.

A resolution was recently passed by the McKinley County Medical Society to call the attention of the Secretary of the Interior, Dr. Hubert Work, to the feeble efforts now being put forth by the Bureau of Indian Affairs in the control of trachoma and tuberculosis among the Navajo Indians, and to request that more adequate methods be enacted for the relief of these people.

In the Stadtisch Krankenhaus, located in the free city of Danzig, one of the operating units is equipped with a novel artificial lighting apparatus. The source of the light is a powerful searchlight, situated outside the operating room, which sends its rays in thru a glass window. The rays are directed toward seven circular glass mirrors arranged at different angles, which reflect the rays to six mirrors suspended from the ceiling; these mirrors in turn reflect the rays to the operating table and the immediate vicinity about it, producing a splendid lighting effect. The system is an enlargement of the idea made use of in the "Shamberg" dental lighting fixture.

Dr. Wm. Mithoefer and associates, Dr. J. Maliniak, Dr. A. G. Beyer, Dr. Wm. J. Topmoeller, Dr. F. D. Conroy and Dr. Helen Scorgie, announced the removal of their offices and the establishment of a private hospital for the treatment of eye, ear, nose and throat diseases and nasal plastic surgery to 19 Garfield place, Cincinnati, Ohio.

On Feb. 14th, Dr. C. F. McClintock, of Detroit, read a paper by invitation of the Cincinnati Ophthalmological Club on "The Connections and Relations of the Eye with the Central Nervous System." The Neurological Society of Cincinnati was invited.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper. Under repeated titles are given additional references to papers already noticed. To secure early mention, copies of papers or reprints should be sent to American Journal of Ophthalmology, 217 Imperial Building, Denver, Colorado.

BOOKS.

Fergus, F. A. The ophthalmoscope and how to use it, with a chapter on diplopia. 48 pages, 17 illustrations. J. and A. Churchill, London. Brit. Jour. Ophth., 1924, v. 8, p. 87.

DIAGNOSIS.

Adrogué, E. Microscopy of living eye. Prensa Med. Argentina, 1924, v. 10, pp. 560-569. Semana Med., 1924, v. 31, pp. 36-42.

Blaskovics, L. v. Letters and numbers in test charts. (3 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 440-448.

Brown, E. J. Tonometry, a correction and apology. (1 table.) A. J. O., 1924, v. 7, pp. 163-164.

Contino, A. Method of determination of visual acuity. (3 ills.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 863-878.

Cross, G. H. Microscopy of living eye. Atlantic Med. Jour., 1924, v. 27, p. 307.

Douglas, J. C. Ophthalmic signs of arteriosclerosis. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 636.

Patton, J. M. Pain with surgical lesions of eye. Surg. Gynec. and Obstet., 1924, v. 38, p. 209.

Proksch. Apparatus for testing visual acuity. Zeit. f. Augenh., 1923, v. 51, p. 365.

Ricci, E. Decimal notation of luminosity. Ann. di Ottal. e Clin. Ocul., 1923, v. 52, pp. 965-973.

Sears, W. H. Ophthalmologist and diagnosis of epidemic encephalitis. Atlantic Med. Jour., 1924, v. 27, pp. 263-266.

Traquair, H. M. Field of vision: contraction or depression? (4 ills. bibl.) Brit. Jour. Ophth., 1924, v. 8, pp. 49-58.

Repeated title. **Vogt.** (A. J. O., 1924, v. 7, p. 170) J. A. M. A., 1924, v. 82, p. 165.

THERAPEUTICS.

Behr. Turpentine in ocular therapeutics. Münch. med. Woch., 1923, p. 1116. Zeit. f. Augenh., 1923, v. 51, p. 373.

Bell, G. H. Diet in ophthalmic therapeutics. (bibl.) A. J. O., 1924, v. 7, pp. 118-125.

Benedetti, de. Diathermotherapy in ophthalmology. (bibl.) Ann. di Ottal. e. Clin. Ocul., 1923, v. 52, pp. 979-986.

Cantonnet, A., Bourguignon, G., and Joltrois, M. Ionization in ocular therapeutics. (dis.) Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 152.

Crignis, R. de. Salt solutions and eye. Zeit. f. Augenh., 1923, v. 51, pp. 361-364.

Koenig, C. J. Danger of applying calomel to mucous membranes after administration of potassium iodid. L'Oto-Rhino-Laryngol. Internationale, Lyon, 1923.

Moore, T. W. Parenteral injections of milk in therapeutics of eye diseases. (dis.) Southern Med. Jour., 1924, v. 17, pp. 130-133.

Repeated title. **Dufour.** (A. J. O., 1923, v. 6, p. 871) Brit. Jour. Ophth., 1924, v. 8, p. 85.

PHYSIOLOGIC OPTICS.

Ascher, K. W. Vision of one-eyed. (3 ills. bibl.) Klin. M. f. Augenh., 1923, v. 71, p. 322.

Landolt. "Specific" visual acuity. Jour. de Psychol., 1923, v. 20, pp. 702-715.

Laurens, H. Relative physiologic value of spectral lights. Visibility of radiant energy. Amer. Jour. Physiol., 1924, v. 67, p. 348.

McFadden, F. Intermittent visual perception or suspenopsia. (8 ills.) Amer. Jour. Phys. Optics, 1924, v. 5, pp. 70-95.

Nitsch. Closure of lids and pupil phenomena. Zeit. f. Augenh., 1923, v. 51, p. 368.

Rutgers, G. E. Dark adaptation. (6 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 449-455.

Ives, H. E. Theory of intermittent vision. (1 fig.) Amer. Jour. Phys. Optics, 1924, v. 5, pp. 120-124.

REFRACTION.

Abelsdorff, G. Myopia of Goethe and his mother. Deut. med. Woch., 1923, v. 49, p. 1525.

Barrett, J. Prevention of myopia. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 636.

Bartels, M. Myopia and intermittent exophthalmos. Klin. M. f. Augenh., 1923, v. 71, p. 465.

Kuschel. Constitution of body and myopia. (1 ill. bibl.) Zeit. f. Augenh., 1923, v. 51, pp. 339-358.

Maddox, E. E. V test for astigmatism. A. J. O., 1924, v. 7, p. 163.

Ryan, E. Myopia. Med. Jour. Australia, 1924, Jan. 5, p. 25.

Sabbadini, D. Voluntary, simultaneous contraction of orbicular and elevator and consequent modification of ocular refraction. (11 ills. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 940-956.

Schwenk, P. N. K. Refraction. A. J. O., 1924, v. 7, pp. 145-147.

Wilson, J. A. Ametropia, its prevalence. Brit. Jour. Ophth., 1924, v. 8, p. 91.

Ziegler, S. L. Technic of refraction, prescribing of glasses. A. J. O., 1924, v. 7, pp. 144-145.

Repeated title. **Paderstein.** (A. J. O., 1924, v. 7, p. 171) J. A. M. A., 1924, v. 82, p. 70.

OCULAR MOVEMENTS.

Banister, J. M. Dynamics of ocular muscles. (5 figs., bibl.) Amer. Jour. Phys. Optics, 1924, v. 5, pp. 3-21.

Bollack, J., and **Lagrange, H.** Epidemic encephalitis, ocular movements and corneal lesions. Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 153.

Goldstein and **Riese.** Eye movements and past-pointing. Klin. Woch., 1923, v. 2, p. 2338.

Kletzky, D. Prescribing prisms in ocular practice. Amer. Jour. Phys. Optics, 1924, v. 5, pp. 40-47.

Knüsel, O. Visibility of tendon fibers at insertion of recti muscles. (2 ills.) Klin. M. f. Augenh., 1923, v. 71, p. 422.

Lancaster, W. B. Principles of nerve conduction and muscle contraction. (dis.) Trans. A. M. A., Sec. on Ophth., 1923, pp. 107-124.

Maffeo, L. Phenomena of nystagmus in anaphylaxis. Riv. Oto-Neuro-Oft., 1923, v. 1, p. 199.

Miners' nystagmus. J. A. M. A., 1924, v. 82, pp. 550-552.

Miners' nystagmus. Brit. Jour. Ophth., 1924, v. 8, pp. 63-65.

O'Connor, R. Shortening of superior rectus as sole operation in convergent strabismus. (dis.) Trans. A. M. A., Sec. on Ophth., 1923, pp. 379-381.

Peter, L. C. Surgical treatment of concomitant squint. Atlantic Med. Jour., 1924, v. 27, pp. 266-268.

Report of committee on collective investigation concerning ocular muscle. Trans. A. M. A., Sec. of Ophth., 1923, p. 373.

Temple-Smith, E. C. Strabismus. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 637.

Wolff, J. Determination of accommodative convergence requirements. (2 figs.) Amer. Jour. Phys. Optics, 1924, v. 5, pp. 96-108.

CONJUNCTIVA.

Aubaret, Rouslacroix and **Hermann.** Conjunctivitis pasteurellosa. Soc. de Biol., 1923, Dec. 23. Gaz. des Hôp., 1924, v. 97, p. 116.

Blegvad, O. Xerophthalmia, keratomalacia and xerosis conjunctivae. (13 figs., 5 tables, bibl.) A. J. O., 1924, v. 7, pp. 89-117.

Conjunctival infection with tubercle. Lancet, 1924, Jan. 26, p. 194.

Gala, A. Calcium treatment of spring catarrh. Bratislavske Lek. Listy, 1923, June, p. 152.

Grove, B. H. Caterpillar conjunctivitis. A. J. O., 1924, v. 7, p. 140.

Jeandelize, P., and **Bretagne, P.** Trachoma in Lorraine. Ann. d'Ocul., 1923, v. 160, p. 988.

Kubik, J. Croupous conjunctivitis. Klin. M. f. Augenh., 1923, v. 71, pp. 358-362.

Morax, V. Diagnosis of trachoma. Ann. d'Ocul., 1923, v. 160, p. 991.

Magdalena, A. Fight against trachoma in Santa Fé. Semana Med., 1923, v. 2, p. 1413.

Nicati, W. Treatment of granular ophthalmia by sterilized injections of sulfat of copper. Bull. de l'Acad. de Méd., 1924, v. 91, p. 62.

Nicolich, M. Contagion and diffusion of trachoma and its prophylaxis. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 733-741.

Nicolle, C., Durand, P., and **Conseil.** Prevention, treatment and etiology of acute conjunctivitis due to Weeks bacillus. Acad. des Sc., 1924, Jan. 2. Gaz. des Hôp., 1924, v. 97, p. 66.

Lemoine, A. N. Parinaud's conjunctivitis. J. A. M. A., 1924, v. 82, pp. 537-538.

Paton, D. D. Trachoma. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 635.

Ryan, E. Trachoma. Med. Jour. Australia, 1924, Jan. 5, p. 25.

Sedan, J. Trachoma in Marseille in 1923. Ann. d'Ocul., 1923, v. 160, p. 991.

Smith, D. V. Bacteriology of trachoma. China Med. Jour., 1923, v. 37, p. 887.

Solovcov, N. Adenoid tissue of conjunctiva. Cas. Lek. Cesk., 1923, v. 62, p. 1161.

Repeated titles. **Jocqs.** (A. J. O., 1924, v. 7, p. 74) Brit. Jour. Ophth., 1924, v. 8, p. 84. **Joux.** (A. J. O., 1923, v. 6, p. 873) Brit. Jour. Ophth., 1924, v. 8, p. 83. **Lundsgaard.** (A. J. O., 1923, v. 6, p. 949) Brit. Jour. Ophth., 1924, v. 8, p. 83.

CORNEA AND SCLERA.

Benoit, M. Trophic lesions of cornea caused by unrecognized foreign body. Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 151.

Blanc, G., and **Carminopetros, J.** Reaction of cornea to experimental infection of nerve by virus of herpes and vaccine. Acad. des Sci., 1923, Dec. 10. Gaz. des Hôp., 1923, v. 96, p. 1657.

Blegvad, O. Treatment of xerophthalmia. Ugesk. f. Laeger., 1923, v. 85, p. 942. Abst. J. A. M. A., 1924, v. 82, p. 430.

Hanssen, R. Discoloration of cornea. (2 ills.) Klin. M. f. Augenh., 1923, v. 71, p. 399-409.

Krämer. Keratoconus. Zeit. f. Augenh., 1923, v. 51, p. 371.

Mendoza, R. Treatment of keratoconus. Arch. de Oft. Hisp.-Amer., 1923, v. 23, p. 768.

Ovio, G. Opaque cornea. Ann. di Ottal. e Clin. Ocul., 1923, v. 52, pp. 956-965.

Sedan, J., and **Hermann, R.** Treatment of ulcerous keratitis in trachoma. Ann. d'Ocul., 1923, v. 160, p. 990.

Shutes, M. H. Blue scleras. Trans. A. M. A., Sec. on Ophth., 1923, p. 382.

Spicer, W. T. Parenchymatous keratitis, interstitial keratitis, anterior uveitis. 63 pages, 41 illustrations. Monograph Suppl. No. 1. Brit. Jour. Ophth., 1924.

Zaviska, P. Lesions of ear with parenchymatous keratitis. Bratislavske Lek. Listy, 1922, May, p. 2.

Repeated titles. **Hamburger.** (A. J. O., 1924, v. 7, p. 172) J. A. M. A., 1924, v. 82, p. 167. **MacEnri.** (A. J. O., 1924, v. 7, p. 74) Brit.

Jour. Ophth., 1924, v. 8, p. 84. **Salvati.** (A. J. O., 1923, v. 6, p. 874) A. J. O., 1924, v. 7, p. 167.

ANTERIOR CHAMBER AND PUPIL.

Gradle, H. S., and Eisendrath, E. B. Reactions of normal pupil. (2 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 311-313.

Jänner. Cyst of anterior chamber. Zeit. f. Augenh., 1923, v. 51, p. 365.

Kofman, T., and Bujadoux, A. Normal and pathologic pupillary reflexometry. Ann. d'Ocul., 1923, v. 160, pp. 943-961.

Licsko, A. Iris atrophy and glaucoma. (4 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 456-459.

Salus, R. Associated movements of pupil. Klin. M. f. Augenh., 1923, v. 71, pp. 289-305.

Thiel, R. Aqueous humor in central nervous affections. Klin. Woch., 1923, v. 2, p. 2195. Abst. J. A. M. A., 1924, v. 82, p. 343.

Wieland and Schoen. Relation between pupil size and carbon dioxid content of blood. (8 curves.) Arch. f. Exper. Path. u. Pharmacol., 1923, v. 100, pp. 190-217.

THE UVEAL TRACT.

Erney, E. H. Tabes dorsalis showing active iritis. (dis.) Arch. of Neur. and Psych., 1924, v. 11, p. 248.

Gilbert, W. Iridocyclitis with recurring hypopyon (septic iritis). Klin. M. f. Augenh., 1923, v. 71, pp. 409-414.

Lowenstein, A. Herpes of iris. (5 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 313-322.

Rollet. Calcareous deposits in iris of crystalline origin. Ann. d'Ocul., 1923, v. 160, p. 988.

Tasaka, Y. Epithelium accidentally forced into iris. Jour. of Oriental Med., 1923, v. 1, p. 179.

Weve. Staphylococcus uveitis. Arch. f. Augenh., 1923, v. 93. Zeit. f. Augenh., 1923, v. 51, p. 374.

SYMPATHETIC DISEASE.

Gibson, J. L. Pseudosympathetic ophthalmia. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 636.

Guiral, R., and Guiral, R. J. Etiology, pathogenesis and treatment of sympathetic ophthalmia. Clin. Opht., 1923, v. 27, pp. 665-674.

Hentschel, F. Sympathetic ophthalmia. (bibl.) Klin. M. f. Augenh., 1923, v. 71, pp. 434-440.

GLAUCOMA.

Clapp, C. A. Etiology of hydrophthalmos. (dis.) A. J. O., 1924, v. 7, p. 151.

Iris inclusion for glaucoma. A. J. O., 1924, v. 7. p. 149.

Gala, A. Effect of calcium on intraocular tension. Bratislavske Lek. Listy, 1923, May, p. 138.

Kadlicky, R. Pathogenesis of glaucoma. Bratislavske Lek. Listy, 1922, June, p. 5.

Kahler, H., and Sallmann, L. Intraocular tension in cerebral hemiplegia. Wien. klin. Woch., 1923, v. 36, pp. 883-887.

Magitot, A. Hypertension following corneal puncture. Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 155.

Nordenson, J. W. Shallowness of anterior chamber in primary glaucoma. Upsala Lek. Forhandl., 1924, v. 29, p. 1.

Reese, R. G. Conjunctival flap for glaucoma. (11 ills.) Trans. A. M. A., Sec. on Ophth., 1923, pp. 317-327. J. A. M. A., 1924, v. 82, pp. 614-619.

Safar, K. Relation between congenital hydrophthalmos and nevus. (2 ills. bibl.) Zeit. f. Augenh., 1923, v. 51, pp. 301-308.

Salus, R. Glaucoma and vascular nevus. Klin. M. f. Augenh., 1923, v. 71, pp. 305-310.

Seidel, E. Theory of filtration. Klin. M. f. Augenh., 1923, v. 71, pp. 368-384.

Trettenero, A. Action of saccharose on intraocular tension. (bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 932-940.

Weekers, L. Ophthalmotonus and concentration of blood molecules. Presse Méd., 1924, v. 32, p. 25. Abst. J. A. M. A., 1924, v. 82, p. 585.

Zentmayer, W. Indications for various operations in glaucoma. (dis.) A. J. O., 1924, v. 7, p. 150.

Repeated titles. **Charlin.** (A. J. O., 1923, v. 6, p. 625) Brit. Jour. Ophth., 1924, v. 8, pp. 73. **Nordenson.** (A. J. O., 1924, v. 7, p. 173) Intern. Sur. Ophth., 1923, v. 6, p. 332. **Vail.** (A. J. O., 1923, v. 6, p. 950) Brit. Jour. Ophth., 1924, v. 8, p. 74. **Weekers.** (A. J. O., 1923, v. 6, p. 1021) Brit. Jour. Ophth., 1924, v. 8, p. 75.

THE CRYSTALLINE LENS.

Ascher, K. W. Is cataract in women connected with ovarian function? Klin. M. f. Augenh., 1923, v. 71, pp. 339-344.

Bailey, H. Lens forceps. Trans. A. M. A., Sec. on Opth., 1923, p. 385.

Bedell, A. J. Lens as seen with Gullstrand slit lamp and corneal microscope. (14 pl. dis.) Trans. A. M. A., Sec. on Ophth., 1923, pp. 33-48.

Clapp, C. A. Liquefaction and absorption of crystalline lens. (3 tables, bibl.) A. J. O., 1924, v. 7, pp. 131-137.

Cruickshank, M. M. Operation for cataract. Indian Med. Gaz., 1923, v. 59, p. 47.

Gala, A. Transition types of morgagnian cataract. Bratislavske Lek. Listy, 1923, March, p. 103.

Gifford, S. R. Coronary cataract and agricultural conjunctivitis. A. J. O., 1924, v. 7, p. 164.

Kraupa, E. Rupture of capsule without cataract. Zeit. f. Augenh., 1923, v. 51, pp. 359-360.

Marbourg, E. M. Posterior polar cataract. A. J. O., 1924, v. 7, p. 149.

Pacalin, G. Treatment of senile cataract. Paris Méd., 1924, Jan. 12, p. 41.

Riedl, A. Posterior and anterior lenticonus. Klin. M. f. Augenh., 1923, v. 71, pp. 344-348.

Scheerer, R. Suction or extraction of cataract? Klin. M. f. Augenh., 1923, v. 71, pp. 470-473.

Strouse, S., and Gradle, H. S. Diabetic cataract in child. J. A. M. A., 1924, v. 82, pp. 546-547.

Szymanski, J. Lateral intracapsular extraction of cataract. (2 ill.) Arch. d'Opht., 1923, v. 40, pp. 729-736.

Wright, R. E. Barraquer operation and vitreous changes. A. J. O., 1924, v. 7, pp. 155-158.

Repeated titles. **Kalt.** (A. J. O., 1923, v. 6, p. 1021) A. J. O., 1924, v. 7, p. 167. **Weill.** (A. J. O., 1923, v. 6, p. 1021; v. 7, p. 167.)

THE VITREOUS HUMOR.

Ball, J. M. Asteroid hyalitis (Benson's disease.) A. J. O., 1924, v. 7, pp. 138-139.

THE RETINA.

Aurand and Jacod. Macular edema, with mydriasis and paresis of accommodation with sinus disease. Arch. d'Opht., 1923, v. 40, p. 744.

Berger, F. v. Edema of retina of Ivanoff. (2 ills. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 52, pp. 973-979.

Birnbacher, T., and Klaften, E. Hemeralopia and pregnancy. Zeit. f. Augenh., 1923, v. 51, pp. 309-324.

Castillo y Ruiz, R. del. Treatment of detachment of retina. Arch. de Oftal. Hisp.-Amer., 1923, v. 23, pp. 750-759.

Duverger and Barré. Ocular troubles resembling retinal embolus. Arch. d'Opht., 1923, v. 40, p. 747.

Heine, L. Visual disturbance with embolus of central retinal artery. Deut. med. Woch., 1923, Dec. 28, p. 1570.

Larkin, B. J. Etiology of retinitis proliferans. (bibl.) Jour. Indiana State Med. Soc., 1924, v. 17, pp. 13-15.

Lent, E. J., and Lyon, M. B. Retinitis proliferans. Jour. Indiana State Med. Soc., 1924, v. 17, pp. 16-22.

Maggiore, L. Visual function in retinitis pigmentosa. (2 diag. 21 fields.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 902-931.

Merz-Weigandt, C. Epidemic of idiopathic hemeralopia. Klin. M. f. Augenh., 1923, v. 71, pp. 362-367.

Metzger, E. L. Traumatic cyst formation in fovea centralis with degeneration of macula in both eyes. (2 col. pl. bibl.) Klin. M. f. Augenh., 1923, v. 71, pp. 424-434.

Neeper, E. R. Retinal detachment. A. J. O., 1924, v. 7, p. 149.

Senile neuroretinal changes. A. J. O., 1924, v. 7, p. 149.

Nitsch. Retinitis circinata and detachment of retina. Zeit f. Augenh., 1923, v. 51, p. 368.

Ryan, E. Albuminuric retinitis. Med. Jour. Australia, 1924, Jan. 5, p. 25.

Wiener, M. Posterior sclerotomy with permanent drain for retinal detachment. (dis. bibl.) Trans. A. M. A., Sec. on Opth., 1923, pp. 227-247.

Repeated titles. **Klainguti.** (A. J. O., 1924, v. 7, p. 173) Intern. Sur. Ophth., 1923, v. 6, p. 300. **Motoo Segi.** (A. J. O., 1923, v. 6, p. 1022) Intern. Sur. Ophth., 1923, v. 6, p. 342. **Tresilian.** (A. J. O., 1923, v. 6, p. 876) Brit. Jour. Ophth., 1924, v. 8, p. 81.

THE OPTIC NERVE.

Barré and Meyer. Optic neuritis and tetany. Arch. d'Opht., 1923, v. 40, p. 746.

Cascio, G. Lo. Development of sheath of optic nerve in man. (19 col. pl. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 879-901.

Cords, R. Monocular malformation (smallness) of optic papilla. (2 ills.) Klin. M. f. Augenh., 1923, v. 71, pp. 414-418.

Hensen, H. Parenteral milk injections in optic nerve diseases. Zeit. f. Augenh., 1923, v. 51, pp. 331-336.

Hermann, R. Treatment of specific optic atrophy with bismuth. Ann. d'Ocul., 1923, v. 160, pp. 961-972.

High, I. B. Optic neuritis secondary to sinus disease. Laryngoscope, 1924, v. 34, pp. 17-26.

Holmes, G. Optic neuritis in relation to cerebral tumors. Med. Press, 1923, Dec. 5. Abst. A. J. O., 1924, v. 7, pp. 166.

Horay, G. Optic neuritis with lactation. Klin. M. f. Augenh., 1923, v. 71, pp. 473-476.

Poppi, A. Therapy of optic neuritis with intracranial hypertension and latent posterior sinusitis. (9 ills. 9 fields, bibl.) Riv. Oto-Neuro-Oft., 1923, v. 1, pp. 103-128.

Retzlaff. Blindness from uterine hemorrhage. Zent. f. Gyn., 1923, p. 1484. Abst. Clin. Jour., 1923, Dec. 26, p. 617.

Stoewer, P. Tuberculosis and inflammation of optic nerve. Zeit. f. Augenh., 1923, v. 51, pp. 325-330.

Terrien, F. Optic atrophy and antityphoid vaccination. (dis.) Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 154.

Velter and Liebault. Acute retrobulbar optic neuritis, polyp of sphenoidal sinus. (dis.) Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 153.

Villard. Optic neuritis of dental origin. Abst. Clin. Jour., 1924, Jan. 23, p. 45.

Wright, R. E. Optic atrophy. Indian Med. Gaz., 1924, v. 59, p. 48.

Repeated titles. **Morax and Lagrange.** (A. J. O., 1923, v. 6, p. 801) A. J. O., 1924, v. 7, p. 166. **Sargnon.** (A. J. O., 1924, v. 7, p. 173) Intern. Sur. Ophth., 1923, v. 6, p. 280. **Terson.** (A. J. O., 1923, v. 6, p. 801) A. J. O., 1924, v. 7, p. 166. **Valude and Chantier.** (A. J. O., 1923, v. 6, p. 1023) A. J. O., 1924, v. 7, p. 166.

VISUAL TRACTS AND CENTERS.

Kubik, J. Central scotoma with brain tumor. (bibl.) Klin. M. f. Augenh., 1923, v. 7, pp. 353-358.

Mauksch. Amaurosis and ring scotoma in sleeping sickness. Zeit. f. Augenh., 1923, v. 51, p. 369.

COLOR VISION.

Roenne, H. Normal and anomalous types of color vision and their mutual relationship. (6 ills.) Reprint, pp. 147-165.

Venable, W. M. Color and luminosity. (6 figs.) Amer. Jour. Phys. Optics, 1923, v. 5, pp. 22-39.

DISEASES OF THE EYEBALL.

Heine, L. Frontal septum in development and malformations of eye. (6 ills.) Zeit. f. Augenh., 1923, v. 51, pp. 285-301.

Repeated title. **Lagrange.** (A. J. O., 1923, v. 6, p. 1024) A. J. O., 1924, v. 7, p. 167.

THE LACRIMAL APPARATUS.

Albrich, K. Spirochete mixed infection of lacrimal sac. (1 ill.) Klin. M. f. Augenh., 1923, v. 71, p. 468.

Crämer. Recurring dacryops. Zeit. f. Augenh., 1923, v. 51, p. 337.

Peters, A. Therapy of phlegmonous dacryocystitis. (Sondermann.) Klin. M. f. Augenh., 1923, v. 71, p. 466.

Toulant, P. Exclusion of lacrimal sac for pericystic suppuration. Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 154.

DISEASES OF THE LIDS.

David, J. Radical operation for trichiasis. (6 ills.) Arch. d'Opht., 1923, v. 40, pp. 737-739.

Boulanger. Late familial ptosis. (bibl.) Lille thesis, 1923. Abst. Clin. Opht., 1923, v. 27, pp. 679-685.

Franklin, W. S., and **Cordes, F. C.** Ossification in chalazion. (1 col. pl. bibl. dis.) Trans. A. M. A., Sec. on Ophth., 1923, pp. 125-130. J. A. M. A., 1924, v. 82, pp. 519-520.

Kestenbaub. Bell's phenomenon and lagophthalmos. Zeit. f. Augenh., 1923, v. 51, p. 367.

Lapersonne, de. Treatment of granulated lids. Acad. de Méd., 1924, Jan. 8. Abst. Gaz. des Hôp., 1924, v. 97, p. 67.

Nobl, G. Xanthoma of eyelid. Med. Klin., 1923, v. 19, p. 1630. Abst. J. A. M. A., 1924, v 82, p. 344.

Stanka, R. Nodular formations in lids. Klin. M. f. Augenh., 1923, v. 71, p. 348.

DISEASES OF THE ORBIT.

Duverger. Pulsating traumatic exophthalmos. Arch. d'Opht., 1923, v. 40, p. 746.

Hallé and **Poulard.** Bilateral spontaneous pulsating exophthalmos. Soc. Méd. d. Hôp., 1923, Dec. 7. Abst. Gaz. des. Hôp., 1923, v. 96, p. 1638.

Meyer-Riemsloh, B. Intermittent exophthalmos. Klin. M. f. Augenh., 1923, v. 71, pp. 460-465.

Rochon-Duvigneaud and **Valiere-Vialeix.** Pulsating exophthalmos treated by ligation of orbital vein. (dis.) Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 152.

Ryan, E. Pulsating exophthalmos. Med. Jour. Australia, 1924, Jan. 5, p. 25.

INJURIES.

Duverger. Wounds of orbit. Arch. d'Opht., 1923, v. 40, p. 745.

Elschnig, H. H. Pseudotumor of orbit after injury from wood splinter. (2 ills.) Klin. M. f. Augenh., 1923, v. 71, p. 351.

Genet. Treatment of intraocular foreign bodies. Arch. d'Opht., 1923, v. 40, p. 742.

Hubeny, M. J. Localization of foreign bodies in eye. Radiology, 1924, v. 2, pp. 33-37.

Jacqueau. Extraction of copper from vitreous. Ann. d'Ocul., 1923, v. 160, p. 986.

Mordoff, C. E. Remote effects in head injuries. California State Jour. Med., 1924 v. 22, pp. 59-61.

Morrison, F. A. Prolonged retention of foreign bodies in eyeball. A. J. O., 1924, v. 7, pp. 139-140.

Neeper, E. R. Eye destroyed by popping of cork. (dis.) A. J. O., 1924, v. 7, p. 148.

Intraocular foreign body. (dis.) A. J. O., 1924, v. 7, p. 149.

Shanklin, E. M. Plea for greater consideration of foreign bodies in cornea. Internat. Jour. Med. and Surg., 1924, Jan., pp. 14-17.

St. Martin, de. Evulsion of right optic nerve with left temporal hemianopsia. Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 155.

TUMORS.

Albrich, K. Epibulbar sarcoma with pigmentation of cornea. (3 ills. bibl.) Klin. M. f. Augenh., 1923, v. 71, pp. 476-480.

Balduzzi, O. Tumor of hypophysis without syndrome. (6 ills. bibl.) Riv. Oto-Neuro-Oft., 1923, v. 1, pp. 181-193.

Bane, W. C. Epithelioma of eyelid. (2 ills.) A. J. O., 1924, v. 7, p. 147.

Bedell, A. J. Osteoma of orbit. (7 ills. bibl.) A. J. O., 1924, v. 7, p. 126-131.

Bertein, Genet and **Arnal.** Chronic osteoperiostitis and tumor of orbit. Ann. d'Ocul., 1923, v. 160, p. 987.

Kafka. Malignant tumor. Zeit. f. Augenh., 1923, v. 51, p. 370.

Magruder, A. C. Retinal tuberculoma. (dis.) A. J. O., 1924, v. 7, p. 148.

Mawas, J. Retinocytoma without rosettes. (dis. only) Soc. d'Opht. de Paris, Feb., 1923. A. J. O., 1924, v. 7, p. 154.

Proksch. Melanoma of papilla and choroid. Zeit f. Augenh., 1923, v. 51, p. 366.

Rollet and **Bussy.** Hypophysis tumor and exophthalmos. Ann. d'Ocul., 1923, v. 160, p. 988.

Rosnoblet and **Pitre.** Orbital cyst. Ann. d'Ocul., 1923, v. 160, p. 987.

Van Duyse, D. Nevocarcinoma of cornea. (7 ills. bibl.) Arch. d'Opht., 1923, v. 40, pp. 705-728.

Wright, R. E. Buediner's modification of Diffenbach's operation for early epithelioma of lower lid. (2 ills.) Brit. Jour. Ophth., 1924, v. 8, pp. 58-60.

PARASITES.

Wright, R. E. Cysticercus cellulosae. Indian Med. Gaz., 1924, v. 59, p. 48.

GENERAL PATHOLOGY.

Cummins, S. L. Infection of guinea-pigs by conjunctival instillation of tubercle bacilli. Tubercle, 1924, v. 5, p. 153.

Finnoff, W. C. Eyes of rabbits following injection of living tubercle bacilli into common carotid artery. (1 col. pl. 14 ills. bibl.) A. J. O., 1924, v. 7, pp. 81-88.

Ginsberg, S., and Buschke, A. Ocular changes in rat after thallium feeding and the factor of endocrins. (bibl.) Klin. M. f. Augenh., 1923, v. 71, p. 399.

Jackson, E. Ophthalmic pathology. A. J. O., 1924, v. 7, pp. 159-160.

Report of committee on hereditary blindness. Trans. A. M. A., Sec. on Ophth., 1923, pp. 374-378.

Ryan, E. Congenital blindness. Med. Jour. Australia, 1924, Jan. 5, p. 25.

Tasaka, Y. Pathologic change of eye in spayed rabbits. Jour. of Oriental Med., 1923, v. 1, p. 157.

GENERAL AND EXTRAOCULAR DISEASES.

Bogossavlietch. Ophthalmic zona. Bordeaux thesis. 1923.

Cornell, W. P. Brain abscess and hernia following sinusitis with involvement of eye. Southern Med. Jour., 1924, v. 7, pp. 116-117.

Gibson, J. L. Ocular syphilis. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 638.

Mitchell, L. Eye in renal disease and arteriosclerosis. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 637.

Nowak. Specific therapy of ocular tuberculosis. Zeit. f. Augenh., 1923, v. 51, p. 370.

Plicque, J. Ocular affections of dental origin. Clin. Opht., 1923, v. 27, p. 698.

Plog, M. Oculocardiac reflex after von Aschner. (bibl.) Klin. M. f. Augenh., 1923, v. 71, pp. 419-422.

Seguini, A. Arsenical preparation in cure of ocular syphilis. (12 ills. 25 fields, bibl.) Riv. Oto-Neuro-Oft., 1923, v. 1, pp. 129-169.

Stieren, E. Role of impacted and unerupted teeth in ocular disorders. Atlantic Med. Jour., 1924, v. 27, pp. 270-271.

Stitzel, J. W. Eye complications following acute sinusitis. (dis.) Jour. Ophth. Oto-Laryng., 1924, v. 28, pp. 19-28.

Wätzold, P. Hereditary syphilitic eye. Deut. med. Woch., 1924, v. 50, p. 11, Abst. J. A. M. A., 1924, v. 82, p. 587.

HYGIENE.

Barrett, J. Causes of blindness. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 637.

Paton, D. D. Prophylaxis in ophthalmic work. Med. Jour. Australia, 1923, Dec. 15, p. 635.

Provision for treatment of ophthalmia neonatorum. Lancet, 1924, Jan. 19, p. 153.

Simpson, R. E. Defective vision and industrial accidents. Amer. Jour. Phys. Optics, 1924, v. 5, pp. 48-56.

OPHTHALMIC SOCIOLOGY.

Adam. Survey on ophthalmology. Med. Klin., 1923, v. 49, p. 1677.

Are optometrists technicians or doctors? California State Jour. Med., 1924, v. 22, p. 67.

Barrett, J. Accidents at sea due to visual defects. (dis.) Med. Jour. Australia, 1923, Dec. 15, p. 637.

Bill in relation to appointment of state specialist for eyes. New York State Jour. of Med., 1924, v. 24, p. 130.

Report of commission on vision of drivers of automobiles. (dis.) Soc. d'Opht. de Paris, 1923, Feb. A. J. O., 1924, v. 7, p. 155.

Report of committee on estimating compensation for eye injuries. Trans. A. M. A., Sec. on Ophth., 1923, pp. 367-368.

Shemeley, W. G. Cooperation between stomatologist and ophthalmologist and oto-laryngologist. Jour. Ophth. and Oto-Laryng., 1924, v. 28, p. 30.

EDUCATION, HISTORY AND INSTITUTIONS.

Hansell, H. F. History of study and practice of refraction in Philadelphia. (dis.) A. J. O., 1924, v. 7, pp. 141-144.

Jackson, E. Editorials. A. J. O., 1924, v. 7, p. 161.

Specialists trustees in the A. M. A. A. J. O., 1924, v. 7, p. 161.

Popularizing knowledge about human body and human eye. Amer. Jour. Phys. Optics, 1924, v. 5, pp. 63-69.

Report of committee on an international year book on ophthalmology. Trans. A. M. A., Sec. on Ophth., 1923, pp. 369-372.

Report of committee on Knapp Testimonial Fund. Trans. A. M. A., Sec. on Ophth., 1923, pp. 362-366.

Saurat, D., and Cabannes, C. Milton and medicine. Jour. de Méd. de Bordeaux, 1924, Jan., pp. 7-12.

Shemeley, W. G. Year 1923 in sphere of eye, ear, nose and throat. Jour. Amer. Instit. of Homeopathy, 1924, v. 17, pp. 166-167.

Silva, E. R. Survey of recent ophthalmology. Arch. del Hosp. Rosales San Salvador, 1923, v. 15, pp. 1-51.

Terson, A. Ophthalmologic nomenclature. Ann. d'Ocul., 1923, v. 160, pp. 929-943.